

SECTION E

SPECIAL PROVISIONS

The following Special Provisions supplement and amend the Standard Specifications for Public Works Construction (latest edition) and the Standard Specifications of the State of California Department of Transportation (Caltrans), latest edition, as noted herein. These Special Provisions have been arranged into a format that parallels the Standard Specifications for Public Works Construction.

SECTION E - SPECIAL PROVISIONS

Table of Contents

Page

PART 1 - GENERAL PROVISIONS

SECTION 1 -TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE AND SYMBOLS **E-5**

1-2 DEFINITIONS

1-3 ABBREVIATIONS

SECTION 2 - SCOPE AND CONTROL OF THE WORK **E-6**

2-1 AWARD AND EXECUTION OF CONTRACT

2-3 SUBCONTRACTS

2-4 CONTRACT BONDS

2-5 PLANS AND SPECIFICATIONS

2-6 WORK TO BE DONE

2-9 SURVEYING

2-10 AUTHORITY OF BOARD AND ENGINEER

2-11 INSPECTION

SECTION 3 - CHANGES IN WORK **E-12**

3-3 EXTRA WORK

3-4 CHANGED CONDITIONS

SECTION 4 – CONTROL OF MATERIALS **E-14**

4-1 MATERIAL AND WORKMANSHIP

SECTION 5 - UTILITIES **E-15**

5-1 LOCATION

5-2 PROTECTION

5-3 REMOVALS

5-4 RELOCATION

5-5 DELAYS

SECTION 6 - PROSECUTION, PROGRESS & ACCEPTANCE OF THE WORK **E-19**

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK

6-7 TIME OF COMPLETION

6-8 COMPLETION, ACCEPTANCE AND WARRANTY

6-9 LIQUIDATED DAMAGES

6-11 SQUENCE OF CONSTRUCTION

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR **E-22**

7-2 LABOR

7-3 LIABILITY INSURANCE

7-4 WORKER'S COMPENSATION INSURANCE

7-5 PERMITS
7-6 CONTRACTOR'S REPRESENTATIVE
7-8 PROJECT SITE MAINTENANCE

SECTION 9 - MEASUREMENT AND PAYMENT **E-29**

9-1 MEASUREMENT AND PAYMENT
9-2 LUMP SUM WORK
9-3 PAYMENT
9-4 CLAIMS

PART 2 - CONSTRUCTION MATERIALS

SECTION 200 - ROCK MATERIALS **E-32**

200-1 ROCK PRODUCTS
200-2 _UNTREATED_BASE MATERIAL

SECTION 207 - PIPE **E-33**

207-17 PVC PLASTIC PIPE
207-25 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

SECTION 210 - PAINT AND PROTECTIVE COATINGS **E-34**

210-6 CONCRETE VAULTS AND MANHOLES

SECTION 212 - LANDSCAPE AND IRRIGATION MATERIALS **E-34**

212-1 LANDSCAPE MATERIALS

SECTION 213 - ENGINEERING FABRICS **E-37**

213-2 GEOSYNTHETICS

SECTION 215 - MISCELLANEOUS DRAINAGE FACILITIES **E-37**

215-1.1 CURB OPENING AUTOMATIC RETRACTABLE SCREENS (ARS)
215-1.3 FLUME FILTER

SECTION 216 - WATER TREATMENT SYSTEM **E-39**

216-1 MODULAR SUBSURFACE FLOW WETLAND SYSTEM
216-2 PUMP SYSTEM
216-3 ELECTRICAL PANEL

SECTION 218 - SIGNS **E-65**

218-1 INFORMATIONAL SIGNS
218-2 NO PARKING SIGNS

PART 3 - CONSTRUCTION METHODS

SECTION 300 - EARTHWORK

E-66

- 300-1 CLEARING AND GRUBBING
- 300-2 UNCLASSIFIED EXCAVATION
- 300-10 GEOTEXTILES FOR SEPARATION

SECTION 306 - UNDERGROUND CONDUIT CONSTRUCTION

E-71

- 306-1 OPEN TRENCH OPERATIONS

SECTION 308 - LANDSCAPE AND IRRIGATION INSTALLATION

E-76

- 308-2 EARTHWORK AND TOPSOIL PLACEMENT
- 308-4 PLANTING
- 308-6 MAINTENANCE AND PLANT ESTABLISHMENT
- 308-7 GUARANTY
- 308-8 PAYMENT

SECTION 310 - PAINTING

E-80

- 310-5 PAINTING VARIOUS SURFACES

APPENDIX I CITY OF TORRANCE PERMIT AND BUSINESS LICENSE

APPENDIX II CITY OF TORRANCE STANDARD PLANS

APPENDIX III SPPWS STANDARD DRAWINGS

**APPENDIX IV CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING
SUMMARY**

APPENDIX V MANUFACTURER DRAWINGS

**APPENDIX VI CONSTRUCTION ACTIVITIES STORM WATER
GENERAL PERMIT ORDER NO. 99-08-DWQ**

PART 1 GENERAL PROVISIONS

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS, UNITS OF MEASURE, AND SYMBOLS

1-2 DEFINITIONS. Add or redefine the following:

Agency – The City of Torrance, herein referred to as CITY.

Board – The City Council of the City of Torrance, herein referred to as City Council.

Engineer –The Public Works Director and/or City Engineer of the City of Torrance, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

Claim -- A separate demand by the Contractor for (A) a time extension, (B) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the Contract and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the Agency.

1-3 ABBREVIATIONS.

1-3.2 Common Usage:

Add the following abbreviations:

| | |
|--------------|---|
| Approx | Approximate |
| ARHM | Asphalt rubber hot mix |
| CA | City Arborist |
| Exist. | Existing |
| L.A.C.D.P.W. | Los Angeles County Department of Public |
| Works | |
| Med. | Median |
| M.L. | Main Line |
| OH | Overhead |
| Ped. | Pedestrian |
| Reconst. | Reconstruct |
| Temp. | Temporary |
| Theo. | Theoretical |
| WM | Wire mesh or water meter |

SECTION 2 - SCOPE AND CONTROL OF THE WORK

2-1 AWARD AND EXECUTION OF CONTRACT. Replace the entire subsection with the following:

Within ten (10) working days after the date of the CITY'S award of contract, the Contractor shall execute and return all Contract Documents required by the CITY. The CITY reserves the right to terminate the award if the above requirement is not met. Such termination will result in the forfeiture of the Proposal Guaranty.

The Contract shall not be considered binding upon the CITY until executed by the authorized CITY officials.

2-3 SUBCONTRACTS

2-3.2 Additional Responsibility. Replace the second sentence of the second paragraph with the following:

The following work will be considered as "Specialty Items":

*Remove Existing Pumps and Install Submersible Pumps.
Install Modular Subsurface Flow Wetland System*

2-4 CONTRACT BONDS. Revise the second sentence of the fourth paragraph to read as follows:

The "Performance Bond" shall remain in effect for one year following the date specified in the Notice of Completion or, if no Notice of Completion is recorded, for one year following the date of final acceptance by the Engineer.

2-5. PLANS AND SPECIFICATIONS.

2-5.1 General. Add the following sentence to the first paragraph to read as follows:

The Contractor shall maintain a control set of Plans and Specifications on the Work site at all times. All final locations determined in the field, and any deviations from the Plans and Specifications, shall be marked in red on this control set to show as-built conditions. Upon completion of the Work, the Contractor shall submit the control set to the Engineer for approval. Final payment will not be made until this requirement is met.

Add the following subsections:

2-5.1.1 Plans. Included as part of the Contract Documents are the following, which show the location, character, dimensions or details of the Work:

1) Project Plans

The existing utility information and data provided with the Contract Documents are based on existing plans and documents. The plans and data are provided for

information only. The Owner does not guarantee their accuracy and correctness. If the Bidder in preparing the Bid Proposal uses this information, the Bidder assumes all risks resulting from conditions differing from the information shown. The Bidder, in consideration for the information being provided, hereby releases the Owner and Consulting Engineer from any responsibility of obligation as to the accuracy of such information or for any additional compensation for work performed due to assumptions based on the use of such information.

2) Standard Plans

- a. City of Torrance Standard Plans, latest edition
- b. Standard Plans for Public Works Construction, latest edition, promulgated by Public Works Standards, Inc.
- c. American Water Works Association Standards, latest edition.

Applicable Standard Plans and information for this project are included in the Appendices of these Specifications.

2-5.1.2 Specifications. The Work shall be performed or executed in accordance with these Special Provisions and the following:

- 1) Standard Specifications for Public Works Construction, latest edition and supplements thereto, hereinafter referred to as the Standard Specifications, as written and promulgated by Public Works Standards, Inc. The Standard Specifications are published by Building News, Inc., 1612 South Clementine Street, Anaheim, CA 92802, Phone: (800) 873-6397.
- 2) American Water Works Association Standards, latest edition.

2-5.2 Precedence of Contract Documents. Replace the entire subsection with the following:

If there is a conflict between any of the Contract Documents, the document highest in precedence shall control. The order of precedence shall be as follows:

- 1) Permits issued by other agencies.
- 2) Change Orders (including Plans and Specifications attached thereto).
- 3) Public Works Agreement
- 4) Addenda
- 5) Special and General Provisions
- 6) Plans
- 7) City Standard Plans
- 8) Other Standard Plans
- 9) Standard Specifications for Public Works Construction
- 10) Reference Specifications

With reference to the Plans/Drawings, the order of precedence is as follows:

- 1) Change Order plans govern over Addenda and Contract plans
- 2) Addenda plans govern over Contract plans
- 3) Contract plans govern over standard plans
- 4) Detail plans govern over general plans
- 5) Figures govern over scaled dimensions

Within the Specifications, the order of precedence is as follows:

- 1) Change Orders
- 2) Permits from other agencies/Supplemental Agreements
- 3) Special Provisions
- 4) Instruction to Bidders
- 5) Referenced Standard Plans
- 6) Referenced Standard Specifications

If the Contractor, in the course of the Work, becomes aware of any claimed errors or omissions in the Contract Documents or in the CITY's fieldwork, the Contractor shall immediately inform the Engineer. The Engineer shall promptly review the matter, and if the Engineer finds an error or omission has been made the Engineer shall determine the corrective actions and advise the Contractor accordingly. If the corrective work associated with an error or omission increases or decreases the amount of work called for in the Contract, the CITY shall issue an appropriate Change Order in accordance with 3-3. After discovery of an error or omission by the Contractor, any related work performed by the Contractor shall be done at the Contractor's risk unless authorized by the Engineer.

2-5.3 Submittals

2-5.3.2 Working Drawings. Add the following:

In addition to the working drawings required per Table 2-5.3.2 (A), the following working drawings are required:

| | | | |
|----|--|---|--|
| 18 | | 3-inch PVC Force Main Brackets | |
| 19 | | Pump System | |
| 20 | | Concrete Pad & Head Wall at Pumps | |
| 21 | | Steel Pipe Relocations Under Proposed Access Road | |

Revise the fourth paragraph of the Standard Specifications to read as follows:

Working drawings listed as Items 6, 9, 10, 13, 14, 16, 17, 18, 19, and 20 shall be prepared, wet stamped, and signed by a Civil or Structural Engineer registered by the State of California.

2-5.3.4 Supporting Information. Add the following:

Submittals are required for the following :

- 1) PVC Pipes
- 2) Pumps
- 3) Flume Filter
- 4) Gravel and rock and Rip Rap
- 5) Landscape materials
- 6) Erosion Control – Post Construction BMP's
- 7) Electrical Panels and Wiring
- 8) Pipe Supports for 3" PVC
- 9) Automatic Retractable Screens
- 10) Wetland Treatment System
- 11) Storm Drain By-pass and Sump Dewatering
- 12) Concrete Pad and Headwall
- 13) Information Sign Brackets, Posts and Foundations

In addition to the above, submittals may be required for any product, manufactured item, and system not specifically listed above.

2-6 WORK TO BE DONE. Add the following:

The Work generally consists of work as shown on City of Torrance Plan No.SD-499 which shows the construction of pumping system (including pumps, pipes and electrical panel) treatment wetland in the corner of a 40 acre site. Other items to be constructed are a concrete structures, catch basin curb screens, river rock installation, planting, and observation deck.

2-9 SURVEYING.

2-9.2 Survey Service. Replace the entire subsection with the following:

All construction surveying necessary to complete the Work shown on the Plans and provided in these Contract Documents shall be accomplished by or under the direction of a Registered Land Surveyor or Registered Civil Engineer authorized to practice land surveying in the State of California, retained or provided by the Contractor. The CITY reserves the right to direct additional construction survey work be performed at no

additional cost when the City determines it is required to adequately construct the Work.

The Contractor shall notify the Engineer in writing at least 2 working days prior to the actual survey.

Stakes shall be set and stationed by the Contractor for curbs, curbs and gutters, sidewalks, access ramps, bus pads, driveways, headers, storm drains, sewers, cross gutters, spandrels, alley intersection, catch basin, rough grade, and other items as necessary. A corresponding cut or fill to finished grade (or flow line) shall be indicated on a grade sheet. A copy of each grade sheet shall be furnished to the Engineer. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be by the Contractor at its expense.

Construction stakes shall consist of the following:

- a. Offset line and grade stakes for gravity sewer at 50-foot intervals with grade sheets indicating cut to the pipe invert.
- b. One set of control stakes for manholes and jacking pits.
- c. One set of paving stakes.
- d. Pipe heading checks for line and grade at each manhole.

The Contractor shall submit to the City within 2 days after completion of each respective survey, setting of each stake and heading check a copy of the survey notes and calculations certified by the licensed Land Surveyor for the following:

- a. Level and horizontal control circuit for survey control.
- b. Grade sheets for pipeline stakes.
- c. Pipe heading checks.

All costs for construction survey staking including construction staking, professional services, office calculations, furnishing all labor, materials, equipment, tools and incidentals, and for doing all work involved shall be considered as included in the price for which such work is appurtenant thereto, and no additional allowance will be made therefore.

Payment for construction surveying shall be on a lump sum basis per the Contract Unit Price. When the Contract does not include a pay item for construction surveying as specified above, and unless otherwise provided in these Special Provisions, full compensation for construction surveying required to complete the Work shall be included in the bid price for the appurtenant items of work.

2-10 AUTHORITY OF BOARD AND ENGINEER. Add the following:

Failure of the Contractor to comply with the requirements of the Contract Documents,

or to follow the directions of the Engineer, and/or to immediately remedy such noncompliance or to follow directions, may, upon notice from the Engineer, result in the suspension of the Contract monthly progress payments. Any monthly progress payments so suspended may remain in suspension until the Contractor is in compliance with the Contract Documents and the directions of the Engineer, as determined by the Engineer.

2-11 INSPECTION. Replace the entire subsection with the following:

The Work is subject to inspection and approval by the Engineer. The Contractor shall notify the Engineer a minimum of 48 hours in advance of the required inspection.

The Engineer will make, or have made, such inspections and tests as he deems necessary to see that the Work is in conformance with the Contract Documents. In the event such inspections or tests reveal noncompliance with the Contract Documents, the Contractor shall bear the cost of such corrective measures as deemed necessary by the Engineer, as well as the cost of subsequent re-inspection and re-testing.

Work done in the absence of inspection by the Engineer may be required to be removed and replaced under the inspection of the Engineer, and the entire cost of removal and replacement, including the cost of all materials which may be furnished by the CITY and used in the work thus removed, shall be borne by the Contractor, regardless of whether the work removed is found to be defective or not. Work covered without the approval of the Engineer shall, if so directed by the Engineer, be uncovered to the extent required by the Engineer, and the Contractor shall similarly bear the entire cost of performing all the work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement, including all costs for additional inspection.

The Engineer and any authorized representatives shall at all times have access to the Work during its construction at shops and yards as well as the Work site. The Contractor shall provide every reasonable facility for ascertaining that the materials and workmanship are in accordance with the Contract Documents.

Inspection of the Work shall not relieve the Contractor of the obligation to fulfill all conditions of the Contract.

Add the following subsections:

2-11.1 Special Inspection Fees. If the Contractor elects to work under this Contract more than 8 hours/day or more than 40 hours/week, Saturday, Sunday, or CITY holidays, the Contractor shall arrange with the Engineer for the required inspection service and pay the Special Inspection Fees which will be charged at the following rates:

| | | |
|------------------------------|---|--------------------|
| Mondays through Fridays | - | \$100.00 per hour |
| Saturdays, Sundays, Holidays | - | \$1,000.00 per day |

Fees may be deducted from payments due to the Contractor at the discretion of the Engineer.

If the Contractor works under this contract at times other than within the allowed

working hours without permission from or prior arrangement with the Engineer, the Contractor will be charged a lump sum amount of \$500.00 for each occurrence, in addition to the above fees. The amount will be deducted from a Progress Payment.

2-11.2 General Requirements. The Contractor shall comply with the following requirements:

2-11.3 Inspections During Construction. During the construction, the Contractor shall make the Work site available for periodic inspections by the regulatory agencies. These agencies may include: Los Angeles Regional Water Quality Control Board, CITY Parks, CITY Community Services and CITY Water Department.

2-11.4 Material Inspection/Testing and other City Expenses.

- (a) If a City subcontractor hired to perform material inspection and/or testing is required to work additional time to perform inspection and testing as a result of an action or delay caused by the Contractor, except for specific work allowed by the Engineer, the City subcontractor may charge the City an additional fee. The Engineer may deduct the additional fee for said inspection and testing from a Progress Payment to the Contractor. The Engineer also may deduct the cost to perform additional testing when an initial test fails to meet the requirements of this Contract. The typical rates for material testing and inspection are available upon request from the Public Works Department.
- (b) If the Contractor does not comply with a requirement of these Special Provisions or if it does not immediately respond, after being informed, to a request by the Engineer to amend a site condition that jeopardizes the public health, safety or welfare, the Engineer may direct City staff to perform the work. For each occurrence, the City will charge the Contractor a base charge in the amount of \$750 in addition to all costs incurred by the City for administration, labor, equipment and materials. The standard rates for City staff are available upon request from the Public Works Department.

SECTION 3 – CHANGES IN WORK

3-3 EXTRA WORK

3-3.1 General. Add the following:

Payment for additional work and all expenditures in excess of the Contract Price must be authorized in writing by the Engineer. Such authorization shall be obtained by the Contractor prior to engaging in additional work. It shall be the Contractor's sole responsibility to obtain written approval from the Engineer for any change(s) in material or in the work proposed by suppliers or subcontractors. No payment shall be made to the Contractor for additional work which has not been approved in writing, and the Contractor hereby agrees that it shall have no right to additional compensation for any work not so authorized.

The Contractor shall be responsible to provide all data and to obtain all approvals required by the Specifications, including submittal of Daily Extra Work Reports. No claims or extras shall be approved by the Engineer unless all work was done under the direction of and subject to the approval of the Engineer. Disputed work claims shall comply with 3-3 as modified herein.

3-3.2.2 Basis for Establishing Costs. Replace the second paragraph of part (c) with the following:

The Contractor will be paid for the use of equipment at the lower of the actual rental rates paid by the Contractor or the rental rates listed for such equipment in either the "Rental Rate Blue Book" published by Dataquest, Inc., 1290 Ridder Park Drive, San Jose, California 95131; telephone (408) 971-9000 or the California Department of Transportation publication entitled "Labor Surcharge and Equipment Rates" available at the Caltrans web site, www.dot.ca.gov/hq/eqsc/inforesources.htm, which is in effect on the date upon which the work is accomplished, and that hereby is made a part of the Contract, regardless of ownership or any rental or other agreement, if such may exist, for the use of such equipment entered into by the Contractor. If it is deemed necessary by the Engineer to use equipment not listed in the said publication, a suitable rental rate will be established by the Engineer. The Contractor may furnish any cost data that might assist the Engineer in the establishment of such rental rate.

3-3.2.3 Markup. Replace the entire subsection with the following:

The markups mentioned hereinafter shall include, but are not limited to, all costs for the services of superintendents, project managers, timekeepers and other personnel not working directly on the change order, and pickup or yard trucks used by the above personnel. These costs shall not be reported as labor or equipment elsewhere except when actually performing work directly on the change order and then shall only be reported at the labor classification of the work performed.

(a) Work by Contractor. The following percentages shall be added to the Contractor's costs and shall constitute the mark-up for all overhead and profit, which shall be deemed to include all items of expense not specifically designated as cost or equipment rental in Subsections 3-3.2.2(a), 3-3.2.2(b), and 3-3.2.2(c).

| | |
|--------------------|----|
| Labor | 20 |
| Materials | 15 |
| Equipment Rental | 15 |
| Other Expenditures | 15 |

To the sum of the costs and markups provided for in this subsection, one (1) percent shall be added as compensation for bonding.

(b) Work by Subcontractor. When any part of the extra work is performed by a subcontractor, the markup established in 3-3.2.3(a) shall be applied to the subcontractor's actual cost of such work. A markup of ten (10) percent on the first \$5,000 of the subcontracted portion of the extra work and a mark-up of 5 percent on work added in

excess of \$5,000 of the subcontracted portion of the extra work may be added by the Contractor.

The markups specified in parts (a) and (b) above shall be considered as including, but not limited to, the Contractor's labor costs for personnel not working directly on the extra work, including the cost of any tools and equipment that they may use. Such costs shall not be reported as labor or equipment costs elsewhere except when they are actually used in the performance of the extra work. Labor costs shall in that case be reported for the labor classification corresponding to the type and nature of extra work performed.

3-4 CHANGED CONDITIONS.

Add the following:

This subsection does not apply to utilities.

SECTION 4 – CONTROL OF MATERIALS

4-1 MATERIAL AND WORKMANSHIP.

4-1.1 General.

Add the following paragraph after the second paragraph:

If the work, or any portion thereof, shall be damaged in any way, or if any defective materials or faulty workmanship shall be discovered at any time prior to the final payment, the Contractor shall forthwith, at its own cost and expense, repair said damage, or replace such defective materials, or remedy such faulty workmanship in a manner satisfactory to the Engineer.

4-1.2 Protection of Work and Materials.

Add the following:

The Contractor shall assume all risks and expense of interference and delay in his operations, and the protection from or the repair of damage to improvements being built under the contract, as may be caused by water of whatever quantity from floods, storms, industrial waste, irrigation, underground or other sources. However, the Contractor shall be entitled to an extension of time in accordance with the provisions of Subsection 6-6. The Contractor shall also assume full responsibility and expense of protecting, or removing and returning to the site of Work, all equipment or materials under his care endangered by any action of the elements.

Furthermore, the Contractor shall indemnify and hold the City harmless from all claims or suits for damages arising from his operations in dewatering the Work and control of water.

SECTION 5 – UTILITIES

5-1 LOCATION Add the following:

The Contractor shall provide coordination with all the utility companies involved and shall provide protection from damage to their facilities. The Contractor shall be responsible for repair or replacement to said facilities made necessary by its failure to provide required protection. The Contractor is required to include utility requirements in the Construction Schedule per Section 6-1.

The Contractor shall utilize the services of "Underground Service Alert-Southern California" for utility locating in all public right-of-ways by calling 1-800-227-2600 at least 48 hours prior to any excavation.

The new piping shall go over or under the existing utilities as indicated on the plans. Where not indicated, the Contractor shall assume that the new piping will cross under the existing utility. The Contractor shall pothole existing utilities as shown on the plans, as directed by the Engineer or as deemed necessary by the Contractor. The cost of potholing herein specified shall be included in the prices paid for other items of work and no additional compensation will be allowed.

Where water lines exist, at each angle point, cross connection and "T" connection, the Contractor, for bidding purposes, shall assume the existence of a concrete thrust block located such as to resolve thrust loads. Any and all costs resulting from the existence of a thrust block, including costs for its removal and restoration if required, shall be deemed as being included in the prices bid for the various items of work.

Underground lines that are potentially hazardous such as oil company lines, natural gas mains, and electrical conduits will be carefully located by the owner as provided in the Standard Specifications. The Contractor shall take special precautions in determining the precise location and depth of these structures to insure that they will not be damaged by its operations.

Substitute the following for the last paragraph:

Prior to starting construction, the Contractor shall be responsible to determine the location and depth of all utilities which have been marked by the respective owners and which may affect or be affected by its operations. The Contractor also shall determine the location and depth of each service connection, whether or not marked. Full compensation for such work shall be considered as included in the prices bid for other items or work. If a utility which was marked or a service connection is found to interfere with the work after construction has commenced, the Contractor shall be solely responsible for all costs of any delay and for any costs which could have been avoided if the Contractor had located the utility prior to start of construction.

5-2 PROTECTION. Add the following:

If, in the course of construction, the Contractor damages a sewer lateral or water lateral, the Contractor shall be responsible to completely expose said lateral from the main line to the point of connection at private property to verify integrity of all joints to the

satisfaction of the Engineer. This shall not be considered to be extra work and no extra costs shall be allowed therefor.

Sewers, including lateral repairs, shall be constructed of Vitrified Clay Pipe, unless otherwise approved in writing by the Engineer.

Add the following after the final paragraph:

As noted in subsections 5-2.1, 5-2.2 and 5-2.3 utilities are classified and are to be handled in one of three ways by the Contractor in the course of performing the contract.

5-2.1 Non-interfering Utilities

Utilities that are not abandoned by the owner and do not physically interfere with the permanent work in its final location shall be supported, protected and maintained in place by the Contractor, and the Contractor shall be solely responsible for any damage, loss or injury, or death resulting from his/her failure to do so and the Contractor shall indemnify and hold harmless the City from any and all such consequences. Non-interfering utilities may, with the permission of the owner and the Public Works Director, be relocated still farther from the permanent work in its final locations, but the Contractor shall not so consider, in submitting his bid, unless the relocation is shown on the plans.

5-2.2 Abandoned Utilities

Abandoned utilities are those portions of any utility which are no longer needed or desired by the owner and whose destruction is consented to by the owner and/or is permitted by notation on the plans. Abandoned utilities which physically interfere with the permanent work or with the construction thereof shall be removed by the Contractor and the Contractor shall be solely responsible for any damage, loss or injury, or death resulting from the removal and the Contractor shall indemnify and hold harmless the City from any and all such consequences.

5-2.3 Interfering Utilities

Any utility shall be deemed an interfering utility (1) which physically occupies any part of the space to be occupied by the permanent work in its final locations, or (2) whose length within the theoretical width of excavation for the permanent work exceeds five times the width of said theoretical excavation whether or not the utility physically interferes with the permanent work. Interfering utilities that are not abandoned by the owner shall be relocated so as not to interfere with the permanent work in its final location. Such relocation will be performed by the owner or the City unless otherwise shown on the plans.

The Contractor shall exercise caution to prevent damage to or movement of the utilities while constructing the permanent work along and adjacent to the utilities.

Should any manhole or structure extend within a trench excavation, the Contractor shall choose one of the following methods of construction and shall assume all responsibilities thereof:

- (1) Support and maintain the manholes in place during the construction of the permanent work in open cut.
- (2) Remove the shaft and maintain the base of the manhole in place until the backfill is placed and compacted; then reconstruct the manhole shaft.
- (3) Use another method of construction which has been submitted to and approved by the Engineer. All costs for the work pertaining to the manholes that might be found to extend partially within the excavation limits or any protective measures required due to the proximity of the manholes and the permanent work at these locations shall be absorbed in the prices bid for the various items of work.

5-2.4 Protection of Underground Hazardous Utilities. This Subsection shall apply to projects where there are underground utilities within the Work area which may be potentially hazardous if damaged. A hazardous substance shall be defined as one having the potential for an immediate disaster such as, but not limited to, gasoline, electricity, fuel oil, butane, propane, natural gas, chlorine or other chemicals.

Abandoned or inoperative utilities designed to carry hazardous substances and unidentified or unknown utilities shall be considered hazardous until determined otherwise. Whenever the Contractor is directed by the Engineer to tap these lines, the Contractor shall provide personnel specialized in this work and payment therefore will be considered as extra work per 3-3 of these Special Provisions.

The Contractor shall comply with the following requirements when working around underground hazardous utilities:

- 1) The Contractor shall not trench or excavate within the area where a utility known to carry a hazardous substance exists until its location has been determined by excavation or other proven methods acceptable to the Engineer. The intervals between exploratory excavations or location points shall be sufficient to determine the exact location of the line. Unless otherwise directed by the Engineer, excavation for underground hazardous utilities shall be performed by the Contractor and paid for as specified per 5-1 of these Special Provisions.
- 2) If it is determined that the horizontal or vertical clearance between the utility known to carry hazardous substances and the construction limit is less than 300 mm (12 inches) (450mm (18 inches) if scarifying), the Contractor shall confer with its owner. Unless the owner elects to relocate the line or take it out of service, the Contractor shall not excavate until the line has been completely exposed within the limits of construction.
- 3) Once the physical location of the utility known to carry hazardous substances has been determined, the Contractor, in cooperation with and with the concurrence of the utility owner, shall determine how to protect and/or support the utility from damage before proceeding with the Work.
- 4) During all excavation and trenching operations, the Contractor shall exercise

extreme caution and protect the utilities from damage.

- 5) The Contractor shall notify the Engineer, the public agency maintaining records for the jurisdiction in which the Project is located and the owner, if known, whenever previously unidentified or unknown underground utilities are encountered so that the location can be accurately established and made a part of permanent substructure records.

Full compensation for protecting underground hazardous utilities as specified or noted on the Plans shall be considered as included in the prices bid for the various items of work.

5-3 REMOVAL.

Add the following:

It shall be the Contractor's responsibility irrespective of the notations on the plans to confirm or determine that a utility is to be abandoned before treating the same as an abandoned utility and shall assume all risks in so determining.

5-4 RELOCATION.

Substitute the following for the last paragraph:

For the purpose of these specifications, service connections shall be construed to mean all, or any portion of, the pipe, conduit, cable, or duct which connects a utility main distribution line to the meter of an individual user, and further, shall include the meter and such portions of said pipe, conduit, cable or duct on the user's side of the meter which affect the contract work or its prosecution.

The City will arrange for the alteration or permanent relocation of only such service connections, except sewer house connections and water laterals, that interfere with the permanent work in its final location and such alteration or permanent relocation will be performed by others at no expense to the Contractor. The Contractor shall be responsible for the alteration or permanent relocation of sewer connections and water laterals, unless otherwise approved by the Engineer.

In instances where the alteration or permanent relocation of interfering service connections can be avoided by encasing same in the slabs or walls of poured-in place concrete structures the Contractor shall, when directed by the Engineer, so encase such service connections, and any costs for such work shall be absorbed in the unit prices or included in the lump sum amounts bid for the various items of work.

Service connections which do not interfere with the project structures shall be maintained in place by the Contractor. The cost of such work shall be absorbed in the unit prices or included in the lump sum amounts bid for the various items of work.

5-5 DELAYS.

Substitute the following:

If the contractor while performing the contract discovers utility facilities not identified by the public agency in the contract plans or specifications, he shall immediately notify the City and utility in writing. The Contractor shall not be entitled to damage or additional payment, nor shall it be entitled to standby time for labor if a delay does occur. The Contractor also shall not be entitled to damage or additional payment for equipment not on the project during the occurrence of the event that caused the related delay. The Engineer will determine the extent of the delay attributable to such interferences, the affect of the delay on the project as a whole, and any commensurate extension of time.

Any failure of the City and/or utility company to accomplish relocations in a reasonable manner in light of the Contractor's operations (to the extent such operations would otherwise be feasible and in accordance with the contract and as disclosed to the City prior to the Contractor encountering any such utility) shall entitle the Contractor to an extension of contract time to the extent that, in the judgment of the Engineer, the Contractor's completion of the overall contract work has been delayed; however, the Contractor shall be entitled to no other remedy and, in submitting its bid, thereby waives such other remedies, if any, unless the relocation delay is the result of arbitrary, capricious or malicious conduct by the City.

SECTION 6 - PROSECUTION, PROGRESS AND ACCEPTANCE OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK. Replace the entire subsection with the following:

6-1.1 General. Within ten (10) working days after the date of the CITY's execution of the Contract, the Contractor shall submit a proposed construction schedule to the Engineer for approval. The schedule shall be in accordance with 6-1.2 and 6-1.3 and shall be in sufficient detail to show chronological relationship of all activities of the Work. These include, but are not limited to: estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, procurement of materials and scheduling of equipment.

Prior to issuing the Notice to Proceed, the Engineer will schedule a Pre-Construction Meeting with the Contractor to review the proposed construction schedule and delivery dates, arrange utility coordination and clarify inspection procedures.

Prior to starting any Work, the Contractor shall attend a Community Meeting to be scheduled by the Engineer. The meeting, to be held in the evening, will address the residents' questions and concerns regarding the Work, what can be expected during construction and vehicular and pedestrian access that may be temporarily restricted during construction.

Notwithstanding any other provisions of the Contract, the Contractor shall not be obligated to perform any work and the CITY shall not be obligated to accept or pay for any work performed by the Contractor prior to delivery of a Notice to Proceed. The CITY's knowledge of work being performed prior to delivery of the Notice to Proceed shall not obligate the CITY to accept or pay for such work. The Contractor shall provide all required Contract bonds and evidences of insurance prior to commencing work at the site.

6-1.2 Criteria. The construction schedule shall conform to the following criteria:

- 1) The schedule shall be prepared using the latest version of Primavera, Microsoft Project or approved equal.
- 2) Work activities shall be based on the items of work per 2-6, and the following:
 - a) Contract Unit Price items shall be subdivided into those portions to be constructed during each stage or phase of construction.
 - b) Lump sum items shall be subdivided into those portions to be constructed during each stage or phase of construction.
- 3) Utility relocations in coordination with the Contractor per 5-4 of these Special Provisions shall be considered as activities.
- 4) Required submittals, working and shop drawings shall be included as activities.
- 5) The procurement of construction materials and equipment with long lead times for deliveries shall be included as activities.
- 6) Work to be performed by subcontractors shall be identified and shown as work activities.
- 7) Start and completion dates of each activity shall be illustrated.
- 8) Completion of all Work under the Contract shall be within the time specified in 6-7 of these Special Provisions and in accordance with the Plans and Specifications.

6-1.3 Requirements. In preparing the construction schedule, the following items shall be considered:

Sequence of Construction - The Contractor shall sequence the Work in a manner to expeditiously complete the project with a minimum of inconvenience to the adjacent owners and to conform to the following:

1. Clear a Grub – The Contractor shall clear and grub work areas and install BMPs to protect undisturbed areas prior to any excavations or grading work.
2. Debris removal – All debris removed shall be hauled off the Work site no later than the same day that the removal is performed.
3. Irrigation systems - Irrigation systems disrupted by the Contractor shall not be left inoperable for more than three working days.
4. Subsection 307-1.3 regarding the ordering of materials.
5. All Work shall only be performed between the hours of 8:00 a.m. and 4:30

p.m. unless otherwise approved by the Engineer.

6. A move-in period of 10 calendar days will be allowed starting on the date in the Notice to Proceed.

7. Stockpile area. Schedule shall indicate date for cleanup of stockpile area.

Should the Contractor fail to meet Requirements of No.3 above, the Engineer reserves the right to prohibit the Contractor from making further removals until the clean up, construction, or rehabilitation of sprinklers is in conformance with the aforementioned requirements. Furthermore, if after notice is given to the Contractor to perform work to meet these requirements, and the Contractor refuses or for any reason fails to perform sufficiently to meet these schedules, CITY may perform said work and charge the Contractor for all costs incurred.

6-1.4 Updates. The Contractor shall submit 2 paper copies of the updated construction schedule to the Engineer on the first working day of each month.

If the Contractor decides to make a major change in the method of operations after commencing construction, or if the schedule fails to reflect the actual progress, the Contractor shall submit to the Engineer a revised construction schedule in advance of beginning revised operations.

Full compensation for complying with all requirements of Section 6-1.4 Updates shall be per the Contract Unit Price for Construction Schedule. If the Contractor fails to submit an updated Construction Schedule to the Engineer on the first working day of each month, the CITY will deduct one-fifth the amount of the Contract Unit Price for each work day after the due date, up to maximum of \$300, that each monthly schedule update is not submitted.

6-7 TIME OF COMPLETION.

6-7.1 General. Replace the first sentence with the following:

Time shall be of the essence in the Contract. The Contractor shall begin Work after the mailing by the Engineer to the Contractor, first class mail, postage prepaid, a Notice to Proceed. The Contractor shall complete all work at the site within 65 working days between August 1 and October 31.

6-8 COMPLETION, ACCEPTANCE AND WARRANTY. Replace the second paragraph with the following:

If, in the Engineer's judgment, the Work has been completed and is ready for acceptance, the Engineer will so certify and will determine the date when the Work was completed. This will be the date when the Contractor is relieved from responsibility to protect the Work. The Engineer may cause a Notice of Completion to be filed and recorded with the Los Angeles County Recorder's Office. At the Engineer's option, the Engineer may certify acceptance to the City Council who may then cause a Notice of Completion to be filed and recorded with the Los Angeles County Recorder's Office.

Add the following subsection:

6-8.1 Manufacturer's Warranties. Manufacturer's warranties shall not relieve the Contractor of liability under these Specifications. Such warranties only shall supplement the Contractor's responsibility.

The Engineer may, at his option, require a manufacturer's warranty on any product offered for use.

6-9 LIQUIDATED DAMAGES. In each of the two paragraphs, substitute "\$ 500.00" in place of "\$250" as the amount of the liquidated damages per each consecutive calendar day.

6-11 SEQUENCE OF CONSTRUCTION

6-11.1 Multiple Headings. In order to meet the contract schedule, the Contractor will be allowed to initiate and maintain two or more construction headings. However, the Contractor will not be allowed to have multiple phases of work occurring that have the corresponding traffic control devices in conflict with each other.

SECTION 7 - RESPONSIBILITIES OF THE CONTRACTOR

7.2 LABOR

Add the following subsections:

7-2.3 Payrolls and Payroll Records

Any payroll and payroll records required for this project shall be submitted, for each week in which any contract work is performed, to the Engineer. A retention of \$5,000 per report per pay period will be withheld from a progress payment for a late or missing report. A report shall be deemed as late or missing when not submitted to the Engineer within 10 calendar days from the close of the pay period for which the report applies. In addition, a non-refundable deduction of \$100 per report per day will be deducted from payments due the Contractor for each late or missing report. The \$100 non-refundable deduction per day will be incurred beginning on the first day the report is late or missing.

7-2.4 Subcontractor and DBE Records

At the completion of the contract if the Contractor does not submit its Subcontractor and DBE Records to the Engineer a retention in the amount of \$10,000 per record will be withheld from a progress payment for a late or missing record. A record shall be deemed as late or missing when not submitted to the Engineer within 15 calendar days from the completion of the contract. In addition, a non-refundable deduction of \$300 per record per day will be deducted from payments due the Contractor for each late or missing record. The \$300 non-refundable deduction per day will be incurred beginning on the first day the record is late or missing.

7-3 LIABILITY INSURANCE. Replace the second sentence of the second paragraph with the following:

The Contractor must maintain at its sole expense the following insurance, which will be full coverage not subject to self-insurance provisions:

- 1) Automobile Liability, including owned, non-owned and hired vehicles, with at least the following limits of liability:
 - a). Combined single limits of \$2,000,000 per occurrence.
- 2) General Liability including coverage for premises, products and completed operations, independent contractors, personal injury and contractual obligations with combined single limits of coverage of at least \$3,000,000 per occurrence, with an annual aggregate of no less than \$5,000,000.

Add the following:

The Contractor must include all subcontractors as insureds under its policies or must furnish separate certificates and endorsements for each subcontractor.

7-4 WORKER'S COMPENSATION INSURANCE. Add the following after the first sentence of the second paragraph:

Worker's Compensation Insurance shall be with limits as required by the State of California and Employer's Liability with limits of \$1,000,000 per accident.

7-5 PERMITS. Replace the second paragraph with the following:

The Contractor shall obtain a City of Torrance Business License and a no-fee Construction Excavation Permit before commencing construction. The Contractor shall obtain no-fee Electrical and Plumbing permits from the Building and Safety Department before commencing installation of new electrical services or on-site irrigation systems, as applicable. The Contractor shall file a Notice of Intent for coverage under the State NPDES Construction Permit.

Full compensation for complying with the above requirements shall be considered as included in the prices bid for the appropriate items of work.

7-6 THE CONTRACTOR'S REPRESENTATIVE

Add a third paragraph to the section stating the following:

The Contractor's Representative shall be approved by the CITY prior to the start of the Work. If the designated representative is rejected, the Contractor shall immediately designate another representative in writing and submit to the City for consideration. The CITY shall have the authority to require the Contractor to remove its representative and/or alternate representative at any time and at no cost to the CITY.

7-8 PROJECT SITE MAINTENANCE.

7-8.1 Cleanup and Dust Control. The second paragraph is amended to read:

Unless directed otherwise by the Engineer, the Contractor shall furnish and operate a water truck with spray nozzles at least once each working day to the City whenever construction, including restoration, is incomplete.

7-8.5 Temporary Light, Power, and Water. Add the following:

The Contractor shall obtain a construction water meter from the CITY by calling Global Water Customer Service at (855) 354-5623. A \$1,000 deposit is required and refundable upon return of the meter in good working condition. The Contractor shall pay for the water used, at the CITY's current water rates.

Some water mains in Torrance are owned/operated by California Water Service. For rental of a hydrant meter the contractor shall call California Water Service at (310) 257-1400.

7-8.6 Water Pollution Control. Add the following subsections:

7-8.6.1 NPDES General Permit, Notice of Intent (NOI) and Notice of Termination (NOT). Construction activities including clearing, grading and excavating that result in land disturbances of equal to or greater than one acre are covered by the National Pollutant Discharge Elimination System General Permit No CAS000002 (General Permit).

Construction activities for Small Linear Underground Projects (Small LUP) including clearing, grading and excavating that result in land disturbances greater than once acre and less than five acres are covered by the National Pollutant Discharge Elimination System General Permit No. CAS000005. Small LUP have been categorized into Tier I and Tier II. Tier I Small LUP typically do not have a high potential to impact storm water quality because they are constructed over a short period of time and not typically during a rain event. Tier II Small LUP have a higher potential to impact storm water quality because they (a) occur outside urban areas; (b) have larger areas of soil disturbance that are not closed by the end of day; (c) have on-site stockpiles of soil; (d) they occur in close proximity to sensitive resources which may include steep topography and/or waterbodies; and (e) have larger areas of disturbed soils exposed for longer time before final clean up.

A copy of the General Permit and Notice of Intent are included in the Appendix of these Specifications/Special Provisions.

This General Permit regulates pollutants in discharges of storm water associated with construction activity. To obtain authorization for proposed storm water discharges, pursuant to this General Permit, the Contractor must prepare a Notice of Intent (NOI) with a vicinity map and appropriate fee for submittal by the City to the State Regional Water Quality Control Board (SWQCB). The City shall sign the NOI, and the Contractor shall provide the check for the fee. Coverage under the General Permit shall not occur until the Contractor develops a Storm Water Pollution Prevention Plan (SWPPP), the SWPPP is approved by the City, and the NOI with map and fee are submitted to the SWQCB. The Contractor shall terminate coverage under the General Permit for a complete project by preparing a Notice of Termination (NOT) for the City to sign and submit to the Regional Water Quality Control Board (RWQCB) and when post construction storm water Best Management Practices (BMPs) are in place.

Full compensation for preparation of the NOI, NOT, vicinity map, required fees, construction, and post construction BMPs, sampling and analysis as required by the RWQCB and all other related costs shall be considered as included in the bid for Mobilization (or NPDES Compliance).

7-8.6.2 Storm Water Pollution Prevention Plan (SWPPP). Construction activities covered by the General Permit require submittal by the Contractor of a Storm Water Pollution Prevention Plan (SWPPP) prior to the start of any clearing, demolition, grading or excavation. A Storm Water Pollution Prevention Plan (SWPPP) shall be defined as a report that includes site map(s), identification of construction and contractor activities that could pollute storm water, and a description of measures and practices to control the potential pollutants. The preparation and implementation of the SWPPP is intended to ensure that the Contractor will make every reasonable effort to prevent the pollution of water resources during the period of construction. The size and nature of this Contract place it under the regulations of the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction Activity. In the State of California, these regulations are adopted by the State Water Resources Control Board. These regulations require a SWPPP for any work where clearing, grading, and excavation result in a land disturbance of one or more acres. As a result, the Contractor shall prepare, submit to the CITY for review and approval, and implement a SWPPP for this Contract in compliance with these regulations.

The handbooks specified in 7-8.6.3 shall be followed and adhered to in preparing the SWPPP. The SWPPP shall be prepared under the supervision of, and signed by, a Civil Engineer registered by the State of California. The SWPPP shall include and incorporate BMPs that address contractor activities, erosion, and sedimentation control. The SWPPP shall also include and incorporate appropriate BMPs for run-off generated by construction activities and other non-storm water sources. During all periods of construction, excavated soils which are stored on-site shall be completely covered with waterproof material and sand (or gravel) bagged or bermed in order that, in the event of a storm, no soil becomes mixed with or transported by storm water run-off.

If, during construction operations, field conditions change in a manner which, in the opinion of the Engineer, significantly deviates from how the SWPPP, as approved by the CITY, addressed the current construction operation, the Engineer may direct the

Contractor to revise the current construction operation and/or the SWPPP. Such directions will be made in writing and will specify the items of work for which the SWPPP is inadequate. No further work on these items will be permitted until the Contractor revises the construction operations to the satisfaction of the Engineer and/or until the Contractor submits a revised SWPPP and receives CITY approval. The Engineer will notify the Contractor of the acceptance or rejection of the revised SWPPP within seven (7) working days from the date of submittal.

The SWPPP shall be submitted to the CITY for review and approval a minimum of fifteen (15) working days prior to the commencement of construction operations in accordance with 6-1 of these Special Provisions. The SWPPP shall remain on the construction site while site is under construction, during working hours, commencing with the initial construction activity and ending with Notice of Termination.

Full compensation for preparation of the SWPPP, revisions to the SWPPP, and all other related costs shall be considered as included in the bid price for SWPPP and BMPS to Protect Wetlands.

7-8.6.3 Best Management Practices (BMPs). Best Management Practices shall be defined as any program, technology, process, siting criteria, operating method, measure, or device which controls, prevents, removes, or reduces pollution. The Contractor shall obtain and refer to the California Storm Water Best Management Practice Handbooks, Volume 3 Construction BMP Handbook and the Los Angeles County Department of Public Works Best Management Practices Handbook for Construction Activities. These publications are available from:

Los Angeles County
Department of Public Works
Cashier's Office
900 S. Fremont Avenue
Alhambra, CA 91803
Telephone (626) 458-6959

The Contractor shall have a minimum of two (2) readily accessible copies of each publication on the Work site at all times.

The Contractor shall implement BMPs in conjunction with the following construction operation and activities:

| | |
|------------------------|-------------------------------------|
| CONSTRUCTION PRACTICES | Clearing, Grading and Excavating |
| | Water Conservation Practices |
| | Dewatering |
| | Paving Operations |
| | Structure Construction and Painting |
| | |
| MATERIAL MANAGEMENT | Material Delivery and Storage |
| | Material Use |
| | Spill Prevention and Control |
| | |
| WASTE MANAGEMENT | Solid Waste Management |

| | |
|-------------------------------------|-----------------------------------|
| | Hazardous Waste Management |
| | Contaminated Soil Management |
| | Concrete Waste Management |
| | Sanitary/Septic Waste Management |
| | |
| VEHICLE AND EQUIPMENT MANAGEMENT | Vehicle and Equipment Cleaning |
| | Vehicle and Equipment Fueling |
| | Vehicle and Equipment Maintenance |

The Contractor shall implement the following BMPs in conjunction with the previously listed construction operation activities:

| | |
|--------------------------|--|
| VEGETATIVE STABILIZATION | Scheduling of Planting |
| | Preservation of Existing Vegetation |
| | Temporary Seeding and Planting |
| | Mulching |
| PHYSICAL STABILIZATION | Geotextiles and Mats |
| | Soil Stabilizer/Dust Control |
| | Temporary Stream Crossing |
| | Stabilized Construction Roadway |
| | Stabilized Construction Entrance |
| | |
| RUNOFF DIVERSION | Sodding, Grass Plugging, and Vegetative Buffer strips |
| | Earth Dikes, Drainage Swales, and Lined Ditches |
| | Top and Toe of Slope Diversion Ditches/Berms |
| | Slope Drains and Subsurface Drains |

| | |
|--------------------|---|
| VELOCITY REDUCTION | Flared Culvert End Sections |
| | Outlet Protection/Velocity Dissipation Devices |
| | Check Dams |
| | Slope Roughening/Terracing/Rounding |
| | |
| SEDIMENT TRAPPING | Slit Fences |
| | Straw Bale Barrier |
| | Sand Bag Barrier |
| | Brush or Rock Filter |
| | Storm Drain Inlet Protection |
| | Sediment Traps |
| | Sediment Basin |

Additional BMPs may be required as a result of a change in actual field conditions, contractor activities, or construction operations. When more than one BMP is listed under

each specific BMP category, the Contractor shall select the appropriate and necessary number of BMPs within each category in order to achieve the BMP objective.

BMPs for contractor activities shall be continuously implemented throughout the year. BMPs for erosion control and sedimentation shall be implemented during the period from October 15 to April 15, and whenever the National Weather Service predicts rain within 24 hours. BMPs for erosion control and sedimentation shall also be implemented prior to the commencement of any contractor activity or construction operation that may produce run-off, and whenever run-off from other sources may occur.

The CITY, as a permittee, is subject to enforcement actions by the State Water Resources Control Board, the Environmental Protection Agency and private citizens. The CITY may assess the Contractor a penalty of \$1,000 for each calendar day that the Contractor has not fully implemented the appropriate BMPs and/or is otherwise in noncompliance with these provisions. In addition, the CITY will deduct, from the final payment due the Contractor, the total amount of any fines levied on the CITY, plus legal and staff costs, as a result of the Contractor's lack of compliance with these provisions and/or less than complete implementation of the appropriate BMPs.

Full compensation for the implementation of BMPs, including the construction, removal, and the furnishing of all necessary labor, equipment, and materials, shall be considered as included in the price bid for SWPPP, BMPS and POST CONSTRUCTION BMPS to Protect Wetlands.

Add the following subsections:

7-8.6.3a Post Construction Best Management Practices (BMP's). The Contractor shall treat the work area from the treatment cells to the sump with necessary soil preparation and with seed mix.

Full compensation for the implementation of Post Construction BMPs, including the construction, removal, and the furnishing of all necessary labor, equipment, and materials, shall be considered as included in the price bid for SWPPP, BMPS and POST CONSTRUCTION BMPS to Protect Wetlands.

7-8.6.4 Dewatering. Add the following subsections:

The Contractor is required to dewater the sump before starting grading in the bottom of the sump. The City shall use the existing stormwater pump station to assist in dewatering. The pump station can pump out water to a depth of approximately six inches. The Contractor shall submit a Dewatering plan for approval that pumps the remaining water to the pump station wet well. To mitigate dewatering the Contractor shall include in the Dewatering plan a by-pass system to divert urban run-off from 72" RCP inlet to pump station wet well.

7-8.8 Contractor's Storage Yard. The City shall provide the Contractor with an area for a storage yard as indicated on the plans.

7-8.9 Graffiti Removal. The Contractor shall maintain the Work, all of its equipment, and all traffic control devices, including signage, free of graffiti throughout the duration of the Contract. The Contractor shall respond to any request from the Engineer to remove graffiti within 4 hours of notification. Should the Contractor fail to respond to such request, the CITY reserves the right to make other arrangements for the requested graffiti removal and deduct the cost from any monies due the Contractor.

SECTION 9 - MEASUREMENT AND PAYMENT

9-1 MEASUREMENT AND PAYMENT. Add the following sections:

9-1.2.1 Payment for Labor and Materials.

The Contractor shall pay and cause the subcontractors to pay any and all accounts for labor, including Worker's Compensation premiums, State Unemployment and Federal Social Security payments and all other wage and salary deductions required by law. The Contractor also shall pay and cause the subcontractors to pay any and all accounts for services, equipment and materials used by it and the subcontractors during the performance of work under this contract. All such accounts shall be paid as they become due and payable. If requested by the Engineer, the Contractor shall immediately furnish the City with proof of payment of such accounts.

9-1.2.2 Measurement and Payment

Payment of each item will include full compensation for furnishing all labor, materials, tools, equipment and backup equipment; transportation and technical competence for performing all work necessary to complete each item as indicated on the plans and as specified in these Contract Documents, including but not limited to obtaining all applicable certifications necessary for specialty personnel and major equipment in conformance with Subsection 7-5, and all other applicable permits; securing a storage yard to store all equipment and materials to be used on the job, disposal of waste materials, restoration of the site, etc. The storage yard may also be used as a temporary storage for excavated materials, and traffic control items. demobilization

9-2 LUMP SUM WORK. Replace the second paragraph with the following:

The Contractor shall, within five (5) working days of receipt of a request from the Engineer, submit a complete breakdown of lump sum bid prices showing the value assigned to each part of the work, including an allowance for profit and overhead. In submitting the breakdown, the Contractor certifies that it is not unbalanced and that the value assigned to each part of the work represents its estimate of the actual cost, including profit and overhead, of performing that part of the work. The breakdown shall be sufficiently detailed to permit its use by the Engineer as one of the bases for evaluating requests for payment. No extra costs shall be allowed for providing these breakdowns.

9-3 PAYMENT.

9-3.2 Partial and Final Payment. Replace the third paragraph with the following:

For each progress estimate, 10 percent will be deducted and retained by the CITY, and the remainder less the amount of all previous payments will be paid. In addition, 125% of the amount of outstanding "Stop Notices" shall be withheld.

Add the following:

The Contractor shall submit all requests for payment on a Progress Payment Invoice.

Prior to submittal of said invoice, all items for which payment is requested shall be checked and approved in writing by the Engineer. No payments will be made unless all back-up data is submitted with the payment request and the Progress Payment Invoice is signed by both Contractor and Engineer.

9-3.4 Mobilization. Replace the entire subsection with the following:

Mobilization shall include the provisions of the Construction Schedule, Sewage Spillage Prevention; SWPPP; Emergency Response Plan; site review; obtaining all permits, insurance, and bonds; moving onto the site all plant and equipment; furnishing and erecting plants, temporary buildings, and other construction facilities, and removal of same at completion of the Work; and other work, all as required for the proper performance and completion of the Work.

Mobilization shall include, but not be limited to, the following items:

- (a) Submittal and modification, as required, of the Construction Schedule.
- (b) Moving on to the site of all Contractor's plant and equipment required for the first month's operations.
- (c) Installing temporary construction power and wiring.
- (d) Establishing fire protection system.
- (e) Developing construction water supply.
- (f) Providing on-site sanitary facilities and portable water facilities, as required.
- (g) Arranging for and erection of Contractor's work and storage yard.
- (h) Submittal of all required insurance certificates and bonds, including subcontractors.
- (i) Obtaining all required permits.
- (j) Posting all OSHA required notices and establishment of safety programs.
- (k) Potholing and other research and review as necessary to verify site conditions and utility locations

- (l) Having the Contractor's Superintendent present at the job site full-time.
- (m) Removal (including all spray-painted markings on any surface), cleanup, and restoration

The lump sum price shown in the Bid shall include full compensation for all mobilization work and shall not exceed 5 percent of the total Contract Bid.

9-3.5 Noncompliance with Plans and Specifications. Add the following section:

Failure of the Contractor to comply with any requirement of the Plans and Specifications, and/or to immediately remedy any such noncompliance upon notice from the Engineer, may result in suspension of Contract Progress Payments. Any Progress Payments so suspended shall remain in suspension until the Contractor's operations and/or submittals are brought into compliance to the satisfaction of the Engineer. No additional compensation shall be allowed as a result of suspension of Progress Payments due to noncompliance with the plans or specifications. The Contractor shall not be permitted to stop work due to said suspension of Progress Payments.

9-4 CLAIMS.

The Contractor shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the CITY, or the happening of any event, thing or occurrence, unless the Contractor shall have given the CITY due written notice of potential claim as hereinafter specified.

The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. Said notice shall be submitted on a form approved by the CITY at least forty-eight (48) hours (two working days) in advance of performing said work, unless the work is of an emergency nature, in which case the Contractor shall notify and obtain approval from the Engineer prior to commencing the work. The Engineer may require the Contractor to delay construction involving the claim, but no other work shall be delayed, and the Contractor shall not be allowed additional costs for any said delay but may be allowed an extension of time if the Engineer agrees that the work delayed is a controlling element of the Construction Schedule. The Contractor shall be required to submit any supporting data (or a detailed written explanation justifying further delay) within five (5) work days of a request from the Engineer and shall be responsible for all costs associated with any delays resulting from late and/or incomplete submittals. By submitting a Bid, the Contractor hereby agrees that this subsection shall supersede 6-6.3 and 6-6.4 of the Standard Specifications.

It is the intention of this subsection that differences between the parties arising under and by virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The Contractor hereby agrees that it shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was timely filed.

PART 2
CONSTRUCTION MATERIALS
SECTION 200 – ROCK MATERIALS

Add the following sections:

200-1.7 COARSE AGGREGATE BED

200-1.7.1 Grading. The grading for coarse aggregate bed shall conform to the following table:

TABLE 200-1.7.1

| Sieve Size | Percent Passsing Sieves |
|-------------------------|--------------------------------|
| 3 / 4 inch | 100 |
| 1 / 2 inch | 30-60 |
| 3 / 8 inch | 20-50 |
| No. 4 | 3-12 |
| No. 8 | 0-1 |
| ASTM C 131 Test Grading | A |

200-1.9 3 / 4 INCH and 1 INCH COARSE CRUSHED AGGREGATE

3 / 4 Inch and 1 Inch coarse crushed aggregate shall conform to Subsection 200-1.2 Table 200-1.2(A).

SECTION 201 – CONCRETE, MORTAR AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE

PCC for ramps shall conform to “Concrete Pavement” Subsection 201-1.1.2 Table 201-1.1.2(A).

200-2 UNTREATED BASE MATERIALS

200-2.1 **General.** Replace the entire subsection with the following:

Untreated base for pavement, curb, gutter, cross gutters, bus pads, hardscape and other improvement shall be Crushed Aggregate Base conforming to 200-2.2.

203-6 ASPHALT CONCRETE

203-6.1 **General.** Add the following:

Asphalt concrete shall be Type Class B-AR-4000 for the base courses, and D2-AR-4000 for leveling courses.

SECTION 207 – PIPE

207-1 NONREINFORCED CONCRETE PIPE

207-17 PVC PLASTIC PIPE

PVC pipe shall be of the size, type, or schedule as shown on the Plans.

207-25 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

207-25.1 General. This subsection applies to polyvinyl chloride (PVC) pressure pipe for the transmission treated water. PVC pipe shall be of the size, type, pressure or class as shown on the Plans or Specifications. PVC pressure pipes, 4-inches through 12-inches in diameter, shall conform to the requirements of AWWA C900, Class 150 minimum. PVC pressure pipes less than 4 inches shall conform to the requirements of ASTM D2241 IPS Gasketed Pipe, SDR 21.

207-25.3 Joints. Joints for PVC pressure pipe shall be integral bell and spigot joints with elastomeric gaskets. Elastomeric gaskets shall comply with the requirements specified in ASTM F477. All pipes shall have a home mark on the spigot end to indicate proper penetration when the joint is made.

207-25.4 Inspections and Certifications. All PVC pressure pipe shall be manufactured in strict accordance with AWWA C900 or C905 and the applicable ASTM standards listed therein. The manufacturer shall furnish an affidavit that all delivered materials comply with the requirements of the above standards.

207-25.5. Fittings. All fittings for PVC pressure pipes shall be ductile iron and shall be in accordance with AWWA C153 and 207-9.2.3 of these Special Provisions. Fittings shall be lined and coated as specified in 207-9.2.4 and encased with polyethylene in accordance with 207-9.2.6 of these Special Provisions. All fittings shall be restrained joint type or shall be thrust blocked and anchored in accordance with City of Torrance Standard Plan No. T713. Bolts shall be stainless steel Type 316 in accordance with ASTM A 276. Bell size shall be for Class 200 cast iron equivalent PVC pressure pipe, including the rubber-ring retaining groove.

207-25.10 Tracer Wire for Non-Metallic Pipelines. Copper tracer wire shall be installed with all non-metallic pipelines, centered and just above the top or crown of the pipe for the purpose of providing a continuous signal path for electronic pipe locators used to determine pipe alignment after installation. The copper wire shall be No. 12 cu. with HMWPE insulation. The wire shall be electrically continuous throughout the entire pipe system including adjacent service line assemblies. At service lines, the wire shall be extended up the pipe and secured by a cable lug under the top nut of one set of bolts. At cul-de-sacs, the wire shall be placed in the same trench with the last long side service lateral and extended into the meter box. All splices shall be wrapped with PVC tape and the wire shall be tied to the pipe at 10-foot intervals with plastic adhesive tape. Tracer wire shall be extended to surfaces. The Contractor shall provide the CITY with results of

electrical continuity test.

SECTION 210 – PAINT AND PROTECTIVE COATINGS

210-6 Concrete Vaults and Manholes. The interior and exterior of concrete vaults and manholes shall be coated with crystalline waterproofing. Crystalline waterproofing shall be cementitious coating containing components that will diffuse into the concrete by water, react with lime, and create an impervious, waterproof, calcified barrier in the substrate. Technical requirements are as follows:

- 1) Permeability at 2.6×10^{-8} cm/sec (2 coats) minimum per Army (COE CRD-C 48-55 or CRD-6 48.73.
- 2) Compatibility; shall produce no degradation of substrate.

SECTION 212 – LANDSCAPE AND IRRIGATION MATERIALS

212-1 LANDSCAPE MATERIALS Add the following:

All work specified in this section shall conform to the applicable requirements of ANSI Standard Z60.1-1980, "Nursery Stock," and to the rules and grading provisions adopted by the American Association of Nurserymen, Inc.

212-1.2 Soil Fertilizing and Conditioning Materials

212-1.2.3 Commercial Fertilizer. Add the following:

Commercial Fertilizer shall be 12-12-12 (N-P-K.) Slow release tablets, if used, shall be 12-12-12 (N-P-K).

212-1.2.4 Organic Soil Amendment. Add the following:

Type I organic soil amendment shall be used. The Contractor shall supply the Engineer with a sample of the proposed amendment accompanied by a laboratory analytical analysis from a testing agency registered by the State, which states that the amendment complies with the specifications.

212-1.2.5 Mulch. Add the following:

Bark mulch shall be shredded cedar, pine, or fir bark or equal commercial product. Typical mulch size shall be three inches by one-half inch (3" x ½"). Submit two (2) samples to the Engineer for approval prior to installation. The material shall be free of seeds, debris, and deleterious materials, and shall have a rich brown color when supplied.

212-1.3 Seed. Add the following:

Seed mix for hydro-seeding as Post Construction BMP shall be as follows:

| Species | Lbs/Acre | % P/G |
|-------------------------------------|----------|-------|
| Layia platyglossa | 1.00 | 70/70 |
| Eschscholzia maritima | 2.00 | 90/60 |
| Lupinus bicolor | 2.00 | 98/85 |
| Lasthenia californica | 1.00 | 70/50 |
| Gilia tricolor | 1.00 | 98/80 |
| Plantago erecta | 3.00 | 90/80 |
| Astragalus trichopodus var. lonchus | 3.00 | 90/50 |
| Dichelostemma capitatum | 2.00 | 90/80 |
| Bloomeria crocea | 2.00 | 90/80 |
| Nemophila menziesii | 2.00 | 98/75 |

For slopes steeper than 2:1, the contractor shall utilize the following hydroseeding slurry components:

| <u>Products</u> | <u>Application Rate</u> |
|---------------------------------------|-------------------------|
| CocoFlex ET-FGM | 3000 lbs/acre |
| Humate organic soil conditioner | 500 lbs/acre |
| Biosol Forte 7-2-1 Organic fertilizer | 800 lbs/acre |
| AM-120 Mycorrhizal inoculum | 70 lbs/acre |

Seed Mix as prescribed by S&S Seeds (805) 684-0436

212-1.4 Plants.

Add the following:

212-1.4.1 All plants furnished by the Contractor shall be true to type or name as shown on the Plans and shall be tagged in accordance with the standard practice recommended by the Agricultural Code of the State of California; however, determination of plant species or variety shall be made by the Engineer, whose decision shall be final.

All plants shall have been grown in nurseries that have been inspected by the governing authorities. Inspection of plant materials required by City, County, State, or Federal authorities shall be the responsibility of the Contractor, and it shall have secured permits or certificates prior to delivery of plants to site. Certificates of inspection shall be filed with the Engineer.

The Contractor shall obtain clearance from the County Agricultural Commissioner, as required by law, before planting plants delivered from outside the County in which they are to be planted. Evidence that such clearance has been obtained shall be filed with the Engineer.

Plants shall be subject to inspection and approval or rejection by the Engineer at place of growth and/or upon delivery to the site at any time before or during progress of the work. Inspections shall include:

- a) Quantity, quality, size, and variety;

- b) Ball and root condition;
- c) Latent defects and injuries resulting from handling, disease and insects; and
- d) Uniformity of plant materials.

The Contractor shall notify the Engineer forty-eight (48) hours before the delivery of plant material, so the plants can be inspected prior to planting.

The Contractor is responsible to coordinate contract growing any plant material that is not readily available at local nurseries. The Contractor shall research the availability of every plant at the beginning of the project to allow sufficient time to contract grow plant material for installation without delays. Contract grown plant material shall be grown to the size indicated on the plans and delivered to the site in a healthy and vigorous condition.

212-1.4.2 Trees. Add the following:

Trees shall be of the type and size as shown on the Plans or specified in the Specifications.

For single-trunk trees: the trunk shall be straight, slightly tapered at the crown, free of disfigurements or gnarls and well hardened off. The tree shall be free of disease and parasites.

For multi-trunk trees: the trunk shall be well hardened off and the tree free of disease and parasites.

212-1.5 Headers, Stakes, and Ties

212-1.5.3 Tree Stakes. Replace the first paragraph with the following:

Tree stakes shall be either 2-inch diameter lodge pole pine, treated with copper nanthanate or pressure treated with chromated copper arsenate, or galvanized steel pipe, per 308-4.6.1 (Method A) and City of Torrance Standard Plan No. T401.

Add the following:

Tree ties shall be a commercially manufactured tie, split plastic hose with a minimum length of twenty inches (20"). Split plastic hose ties shall be "Cinch-tie" by V.I.T. or approved equal.

212-1.6 SHRUBS AND GRASSES. Shrubs and grasses shall be of the type, size, and density as shown in the construction drawings. Substitutions shall be permitted subject to the approval of the City. Vigorous, healthy plants having healthy and well-branched root

systems shall be provided. Plants shall be free from disease, with no leaf damage, wilting, or chlorosis, and no insect damage or sunscald injury.

SECTION 213 – ENGINEERING FABRICS

213-2 GEOSYNTHETICS

213-2.1 General. Replace the first paragraph with the following:

Geotextile fabric shall be non-woven conforming to the requirements of AASHTO Designation M288-99.

Delete the last two paragraphs.

213-2.2 Physical Properties. Replace the entire subsection with the following:

Where specified in the plans for the purpose of separation between underlying subgrade and aggregate or miscellaneous base, Non-woven geotextiles shall meet the requirements of Type 250N indicated in Table 213-2.2(A).

213-2.3 Identification. Delete the last sentence.

213-2.4 Payment. Payment for geotextile fabrics shall be included in lump sum cost of Modular Wetland System.

SECTION 215 – MISCELLANEOUS DRAINAGE FACILITIES

215-1 CURB OPENING AUTOMATIC RETRACTABLE SCREENS (ARS)

The Storm Drain Screen shall be manufactured from stainless steel, and custom designed to fit across the opening of curb inlet mentioned dimensions. The perforated Drain Screen shall enable water flow while trapping green waste and debris at the curb.

The Storm Drain Screen should operate on automatic retraction dependent upon variable flow rate. The Drain Screen shall be designed with an automatic locking mechanism that prevents tampering or municipal street sweeping debris from entering into the drain. The locking mechanism shall remain closed during dry weather and open automatically during a storm even or heavy nuisance water.

Curb opening automatic retractable screens shall be Surf Gate WCS or equal:

1. Model: **Surf Gate**
Manufacturer: American Stormwater Inc.
19500 Normandie Ave.
Torrance, CA 90502
Contact: Todd Waters
(310) 354-9999, Ext. 284
TWaters@ecologycontrol.com

www.americanstormwater.com

2. Model: WCS ARS Manufacturer:
WCS
654 S. Lincoln Avenue, San Bernardino, CA 92408
Contact: Brian Martello
(909) 890-5700
bmartello@WCStorm.net

215-2 FLUME FILTER

Flume filter shall be BioMedia Green or approved equal with the following characteristics:

Physical Specifications:

Density = 0.046 kg/dm³
Porosity = 97%
Hydraulic Conductivity = 363 to 4001 m/d

Performance: (Removal efficiencies - min)

TSS = 85%
Dissolved Phosphorus = 69%
Dissolved Copper = 79%
Dissolved Lead = 98%
Dissolved Zinc = 78%
Oils & Grease = 90%
TPH = 99%
Turbidity = 99%
Fecal Coliform = 68%

215-3 Basis of Payment for Miscellaneous Drainage Facilities

The Contract Unit Price for each curb opening automatic retractable screen shall include full compensation for all work involved in furnishing and installing curb opening automatic retractable screen in accordance with the Plans and with the manufactures recommendations.

The Contract Unit Price for flume filter shall include full compensation for all work involved in furnishing and installing grate inlet filter insert sin accordance with the Plans and with the manufactures recommendations.

Section 216 - WATER TREATMENT SYSTEM

216-1 MODULAR SUBSURFACE FLOW WETLAND SYSTEM

216-1.1 GENERAL

216-1.1.1 Purpose

The purpose of this specification is to establish generally acceptable criteria for Modular Subsurface Flow Wetland Systems used for filtration of storm water runoff including dry weather flows. It is intended to serve as a guide to producers, distributors, architects, engineers, contractors, plumbers, installers, inspectors, agencies and users; to promote understanding regarding materials, manufacture and installation; and to provide for identification of devices complying with this specification.

216-1.1.2 Description

Modular Subsurface Flow Wetland System (MSFWS) units are used for filtration of storm water runoff including dry weather flows. The MSFWS is a pre-engineered biofiltration system composed of a manufactured pretreatment device containing multiple filtration cartridges, water transfer system, subsurface flow wetland utilizing sorptive filter media and vegetation, and flow control discharge chamber. This system is to be used for horizontal flowing runoff only. Treated water flows horizontally through the separation portion of the pretreatment device, filtration cartridges and sorptive filter media and travels outwardly to the flow control discharge chamber.

216-1.1.3 Manufacturer

The manufacturer of the MSFWS pretreatment device, water transfer system, and flow control discharge chamber shall be one that is regularly engaged in the engineering design and production of systems developed for the treatment of stormwater runoff for at least (10) years and which have a history of successful production, acceptable to the Engineer of work. In accordance with the Drawings, the MSFWS(s) shall be a filter device Manufactured by Bio Clean Environmental Services, Inc., or Modular Wetland Systems, Inc., or equal or assigned distributors or licensees. Bio Clean Environmental Services Inc., and Modular Wetland Systems, Inc., can be reached at:

Corporate Headquarters:
Bio Clean Environmental Service, Inc.
2972 San Luis Rey Road
Oceanside, CA 92058
Phone: (760) 433-7640
Fax: (760) 433-3176
www.biocleanenvironmental.net

Corporate Headquarters:
Modular Wetland Systems, Inc.
P.O. Box 869
Oceanside, CA 92049
Phone: (760) 433-6898
www.modularwetlands.net

216-1.1.4 Submittals

Shop drawings are to be submitted with each order to the contractor and consulting engineer.

Shop drawings are to detail the MSFWS and all components required and the sequence for installation and include:

- G. System configuration with primary dimensions
- H. Interior components
- I. Any accessory equipment called out on shop drawings

Inspection and Maintenance documentation submitted upon request.

216-1.1.5 Work Included

Specification requirements for installation of MSFWS.

Manufacture to supply completely assembled MSFWS(s);

- J. Pretreatment Device
- K. Water Transfer System
- L. Flow Control Discharge Chamber
- M. Sorptive Filter Media

Reference Standards

| | |
|-------------|---|
| ASTM C 29 | Standard Test Method for Unit Weight and Voids in Aggregate. |
| ASTM C 88 | C 88 Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate. |
| ASTM C131 | C 131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregates by Abrasion and Impact in the Los Angeles Machine. |
| ASTM C 136 | C 136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates |
| ASTM C 330 | C 330 Standard Specification for Lightweight Aggregate for Structural Concrete. |
| ASTM D 698 | Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft.-lbf/ft ³ (600 kN-m/m ³). |
| ASTM D 1621 | 10 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics |
| ASTM D 1777 | ASTM D1777 - 96(2007) Standard Test Method for Thickness of Textile Materials |
| ASTM D 4716 | Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head |

| | |
|----------------|--|
| AASHTO T 99-01 | Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in) Drop |
| AASHTO T 104 | Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate |
| AASHTO T 260 | Standard Method of Test for Sampling and Testing for Chloride Ion in Concrete and Concrete Raw Materials. |
| AASHTO T 288 | Standard Method of Test for Determining Minimum Laboratory Soil Resistivity. |
| AASHTO T 289 | Standard Method of Test for Determining ph of Soil for Use in Corrosion Testing |
| AASHTO T 291 | Standard Method of Test for Determining Water Soluble Chloride Ion Content in Soil |
| AASHTO T 290 | T 290 Standard Method of Test for Determining Water Soluble Sulfate Ion Content in Soil |

216-1.2 – COMPONENTS

216-1.2.1 Pretreatment Device Components

216-1.2.1.1 Pretreatment Structure shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A-615, Grade 60, and supports and H2O loading as indicated by AASHTO. The drainage structure shall house

216-1.2.1.2 Filter Cartridges shall have a minimum 30 square feet of surface area per cartridge. The filter media contained in the cartridge should be solid in state (not granular) with a void percentage of 80%.

| | | |
|-----------------|--------------------------------|-----|
| Silicon dioxide | SiO ₂ | 47% |
| Aluminum oxide | Al ₂ O ₃ | 14% |
| Titanium oxide | TiO ₂ | 1% |
| Ferrous oxide | FeO | 8% |
| Calcium oxide | CaO | 16% |
| Magnesium oxide | MgO | 10% |
| Manganese oxide | MnO | 1% |
| Sodium oxide | Na ₂ O | 2% |
| Potassium oxide | K ₂ O | 1% |

216-1.2.1.3 Pervious Pavers shall be manufactured of natural stone pavers that have a minimum flow through rate of one gallon per second per square foot. The pervious pavers shall be approximately 2" in thickness.

216-1.2.2.4 Water Transfer System

- Slotted 4" diameter SDR 35 piping shall be used. The slots shall be a width of between 1/16" and 1/8". The spacing between the

slots shall be 3/16". The length of the slots shall be between 3" to 4". The slots shall be on at least two sides of the pipe. Preferably opposite sides with the center of the slots being 180 degrees opposite of the other set of slots. Slots shall cover more than 70% of the pipe length. Standard perforated pipe with round holes is not acceptable.

- Filter Netting shall be 100% Polyester with a number 16 sieve size, and strength tested per ASTM D 3787.
- Drainage Cells shall be manufactured of lightweight injection-molded plastic and have a minimum compressive strength test of 6,000 psi and a void area along the surface making contact with the filter media of 75% or greater. The cells shall be at least 2" in thickness and allow water to freely flow in all four directions.
- Water Distribution System shall be made of a high-density polyethylene. The core shall be constructed using interconnected corrugated pipes that define and provide the flow channels and structural integrity of the drain. The core of the collection system shall conform to the following physical property requirements.

| | | |
|---------------------------|--|------|
| Thickness, inches | ASTM D-1777 | 1.0 |
| Flow Rate, gpm/ft* | ASTM D-4716 | 30 |
| Compressive Strength, psf | ASTM D-1621 (modified sand method) | 6000 |

216-1.2.2 Subsurface Flow Wetland

- 216-1.2.2.1 Media shall consist of structural light weight aggregates made of ceramic material produced by expanding and vitrifying select shales, clays, and slates in a rotary kiln. This process produces a high quality ceramic aggregate that is structurally strong, physically stable, durable, environmentally inert, light in weight, and highly insulative. It is a natural, non toxic, absorptive aggregate that is dimensionally stable and will not degrade over time. Media must be produced to meet the requirements of ASTM C330, ASTM C331, and AASHTO M195. Aggregates must have a minimum 24 hour water absorption of 10.5% mass.
- 216-1.2.2.2 Planting shall be native drought tolerant species recommend by manufacture and or landscape architect. Vetiver grass is the recommended plant for this system to ensure maximum performance.
- 216-1.2.2.3 Plant Support Media shall be made of a 3" thick moisture retention cell that is inert and contains no chemicals or fertilizers.
- 216-1.2.2.4 Impervious Liner shall consist of a three layer membrane of pervious non-woven geofabric on top and bottom with a impervious pvc liner sandwiched in between. Use 2" sand backfill underneath Liner to prevent punctures.

216-1.2.3 Discharge Chamber

216-1.2.3.1 Water Transfer System

Comment [ZK1]: Use the same verbage as in the pretreatment chamber.

- Slotted 4" diameter SDR 35 piping shall be used. The slots shall be a width of between 1/16" and 1/8". The spacing between the slots shall be 3/16". The length of the slots shall be between 3" to 4". The slots shall be on at least two sides of the pipe. Preferably opposite sides with the center of the slots being 180 degrees opposite of the other set of slots. Slots shall cover more than 70% of the pipe length. Standard perforated pipe with round holes is not acceptable.
- Filter Netting shall be 100% Polyester with a number 16 sieve size, and strength tested per ASTM D 3787.
- Drainage Cells shall be manufactured of lightweight injection-molded plastic and have a minimum compressive strength test of 6,000 psi and a void area along the surface making contact with the filter media of 75% or greater. The cells shall be at least 2" in thickness and allow water to freely flow in all four directions.
- Water Distribution System shall be made of a high-density polyethylene. The core shall be constructed using interconnected corrugated pipes that define and provide the flow channels and structural integrity of the drain. The core of the collection system shall conform to the following physical property requirements.

| | | |
|---------------------------|------------------------|------|
| Thickness, inches | ASTM D-1777 | 1.0 |
| Flow Rate, gpm/ft* | ASTM D-4716 | 30 |
| | ASTM D-1621 | 6000 |
| Compressive Strength, psf | (modified sand method) | |

216-1.2.4 Discharge Structure shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A-615, Grade 60, and supports and H20 loading as indicated by AASHTO. The drainage structure shall house;

- Flow control orifice that restrict flow greater than 3 gmp.
- Flow Bypass that discharges all flows greater than 25 gpm.

216-1.3 PERFORMANCE

216-1.3.1 General

216-1.3.1.1 Function -

The MSFWS has no moving internal components and functions based on gravity flow, unless otherwise specified. The MSFWS is composed of a pretreatment device, water transfer system, and flow control discharge chamber. The pretreatment device houses cartridge media filters, which is solid state filter media housed in a perforated enclosure. The untreated runoff flows into the system via subsurface piping. Water entering the system is forced through the perforated filter cartridge enclosures. Then the flow contacts the filter media. The flow through the media is horizontal toward the center of each piece of rectangular media. In the center of the media shall be a round slotted PVC pipe of no greater than 1". The slotted PVC pipe shall extend downward into the water transfer cavity. The slotted PVC pipe shall be threaded on the bottom to connect to the water transfer cavity. After pollutants have been removed by the filter media the water discharges the pretreatment device and flows into the water transfer system and is conveyed to the Subsurface Flow Wetland. Once runoff has been filtered by the sorptive media in the subsurface flow wetland it is collected by a water collection system and conveyed to a discharge chamber equipped with a flow control orifice. Finally the treated flow is discharged to a Municipal Separate Storm Sewer System.

216-1.3.1.2 Pollutants –

The MSFWS will remove and retain debris, sediments, TSS, dissolved and particulate metals and nutrients including nitrogen and phosphorus species, bacteria, BOD, TOC, oxygen demanding substances, organic compounds and hydrocarbons entering the filter during frequent storm events and continuous dry weather flows.

216-1.3.1.3 Treatment Flow Rate and Bypass - The MSFWS operates in-line. The MSFWS will treat 100% of the required water quality treatment flow based on a Minimum Filtration Capacities listed in section 03.02.00. The size of the system must match those provided on the drawing to ensure proper performance and hydraulic residence time.

216-1.3.1.4 Pollutant Load – The MSFWS pretreatment device must be designed to have minimum storage capacity of 105 cubic feet of solids and 3 cubic feet of hydrocarbons on the surface of the filtration media.

216-1.3.1.5 Filter Media Performance Protocol and Results - The filter media must be tested by an independent 3rd party consultant and laboratory to determine the hydraulic conductivity and the pollutant removal capability. The filter media shall be capable of capturing a minimum of 85.35% TSS (mean particle size 20 microns) using a sil-co-sil 106 particle size distribution or similar. The filter media must be composed of the following:

| | | |
|-----------------|--------------------------------|-----|
| Silicon dioxide | SiO ₂ | 47% |
| Aluminum oxide | Al ₂ O ₃ | 14% |
| Titanium oxide | TiO ₂ | 1% |
| Ferrous oxide | FeO | 8% |
| Calcium oxide | CaO | 16% |
| Magnesium oxide | MgO | 10% |
| Manganese oxide | MnO | 1% |
| Sodium oxide | Na ₂ O | 2% |
| Potassium oxide | K ₂ O | 1% |

216-1.3.2 Lab Test Performance

At a minimum, the MSFWS shall meet these performance standards:

Removal efficiencies from an independent third party:

- TSS – 85.35% (mean particle size 20 microns)
- Dissolved Phosphorus – 69.66%
- Dissolved Copper – 79.15%
- Dissolved Lead – 98.19%
- Dissolved Zinc – 78.22%
- Oils & Grease – 90.70%
- TPH – 99.99%
- Turbidity – 99.19%
- Fecal Coliform – 68.00%
- Physical Specifications
 - Density (kg/dm³) of Filter Media 0.046
 - Porosity (%) of Filter Media 97.6
 - Filter Media Hydraulic Conductivity 0.00464 m/s = 400.896 m/d (test 1) / Hydraulic Conductivity 363 m/d (test 2)

Minimum Treatment and Bypass Flow Capabilities

- System must be capable of treating flows up to 25 gallons per minute (gpm). The flow rate shall be controlled by an orifice downstream from the subsurface flow wetland. The treatment capacity of the system and the hydraulic conductivity of the media must be greater than the 25 gpm when not controlled without an orifice plate.

216-1.4 – Execution

216-1.4.1 General

The installation of the MSFWS shall conform to all applicable national, state, state highway, municipal and local specifications.

216-1.4.2 Installation

The Contractor shall furnish all labor, equipment, materials and incidentals required to install the (MSFWS) device(s) and appurtenances in accordance with the Drawings and these specifications.

- 216-1.4.2.1 Grading and Excavation site shall be properly surveyed by a registered professional surveyor, and clearly marked with excavation limits and elevations. After site is marked it is the responsibility of the contractor to contact local utility companies and or DigAlert to check for underground utilities. All grading permits shall be approved by governing agencies before commencement of grading and excavation. Soil conditions shall be tested in accordance with the governing agencies requirements. All earth removed shall be transported, disposed, stored, and handled per governing agencies standards. It is the responsibility of the contractor to install and maintain proper erosion control measures during grading and excavation operations.
- 216-1.4.2.2 Compaction – All soil shall be compacted per registered professional soils engineers recommendations prior to installation of MSFWS components.
- 216-1.4.2.3 Backfill shall be placed according to a registered professional soils engineers recommendations, and with a minimum of 6" of gravel under all concrete structures and a minimum of 2" of sand under the limits of the subsurface flow wetland area.
- 216-1.4.2.4 Concrete Structures – After backfill has been inspected by the governing agency and approved the concrete structures shall be lifted and placed in proper position per plans.
- 216-1.4.2.5 Wetland Liner shall be laid over backfill covering the entire excavated area. The wetland liner shall consist a three layer membrane of pervious non-woven geofabric on top and bottom with a pvc liner sandwiched in-between. The PVC liner shall be one continuous sheet with no seams.
- 216-1.4.2.6 Water Transfer Systems shall be installed per manufactures drawing and specifications. All holes cut through the Wetland Liner shall be sealed water tight after all water transfer system components have been installed.
- 216-1.4.2.7 Subsurface Flow Wetland Media shall be carefully loaded into area so not to damage the Wetland Liner or Water Transfer Systems. The entire wetland area shall be filled to a level 9 inches below finished surface. The contractor must provide the appropriate equipment to properly install the wetland media without damaging the line.
- 216-1.4.2.8 Planting layer shall be installed per manufactures drawings and consisting of a minimum 3" of a growth enhancement media that ensures greater than 95% plant survival rate, and 6" of wetland media. Planting shall consist of native plants recommended by manufacture and or landscape architect. Planting shall be drip irrigated for at least the first 3 months to insure long term plant growth. No chemical herbicides, pesticides, or fertilizers shall be used in the planting or care and maintenance of the planted area.

216-1.4.3 Shipping, Storage and Handling

- 216-1.4.3.1 Shipping – MSFWS shall be shipped to the contractors address or job site and is the responsibility of the contractor to offload the unit(s) and place in the exact site of installation.

216-1.4.3.2 Storage and Handling– The Contractor shall exercise care in the storage and handling of the MSFWS and all components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor. MSFWS(s) and all components shall always be stored in the indoors and transported inside the original shipping container until the unit(s) are ready to be installed. The MSFWS shall always be handled with care and lifted according to OSHA and NIOSA lifting recommendations and/or contractor's workplace safety professional recommendations.

216-1.4.4 Maintenance and Inspection

216-1.4.4.1 Inspection – After installation, the contractor shall demonstrate that the MSFWS has been properly installed at the correct location(s), elevations, with appropriate components. All components associated with the MSFWS and its installation shall be subject to inspection by the Engineer at the place of installation. In addition, the Contractor shall demonstrate that the MSFWS has been installed per the manufactures specifications and recommendations. All components shall be inspected by a qualified person once a year and results of inspection shall be kept in an inspection log.

216-1.4.4.2 Maintenance – The Contractor shall maintain the system and plantings for 90 days. The Maintenance shall be preformed by someone qualified. A Maintenance Manual shall be provided from the manufacturer. The manual has detailed information regarding the maintenance of the MSFWS. A Maintenance/Inspection record shall be kept by the maintenance operator. The record shall include any maintenance activities preformed, amount and description of debris collected, and the condition of the filter.

216-1.4.4.3 Material Disposal - All debris, trash, organics, and sediments captured by the MSFWS shall be transported and disposed of at an approved facility for disposal in accordance with local and state requirements. Please refer to state and local regulations for the proper disposal of toxic and non-toxic material.

216-1.5 – Quality Assurance

216-1.5.1 Warranty

The Manufacture shall guarantee the MSFWS against all manufacturer defects in materials and workmanship for a period of (5) years from the date of delivery to the site. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The MSFWS is limited to recommended application for which it was designed.

216-1.5.2 Performance Certification

The MSFWS manufacture shall submit to the Engineer of Record a "Manufacturer's Performance Certificate" certifying the MSFWS is capable of achieving the specified

removal efficiency for suspended solids of at least 85% with a mean particle size of 20 microns.

SECTION 216-2 PUMP SYSTEM

SECTION 216-2.1 WETLAND TREATMENT SYSTEM PUMP

216-2.1.1 General. Furnish and install One **ABS Model AS 0630 Pump(s)** with a submersible motor to deliver 50 USGPM against a total head of 40 feet. The motor shall be 3.35 HP, 1690 RPM connected for operation on a 230 volt, 60 HZ, three phase service. The motor shall be an integral part of the pumping unit. The pump discharge shall be 3 inch horizontal. The pump(s) shall be of the submersible type with an integral motor and pumping unit. The pump(s) shall have a semi-open vortex impeller capable of handling solids laden fluids without clogging.

216-2.1.2 Pump Construction.

216-2.1.2.1 Impeller: The impeller shall be constructed of corrosion resistant chilled gray iron and shall be semi-open and shall be of the semi-open, non-clogging, dynamically balanced multi-vane design capable of passing a minimum of 2 3/8 inch spherical solids. The impeller shall have a slip fit onto a shaft and drive key and shall be fastened by a stainless steel bolt.

216-2.1.2.2 Pump Volute: The pump volute shall be constructed of gray cast iron with smooth internal surfaces free of rough spots or flashing. The volute shall have a horizontal discharge.

216-2.1.2.3 O-Rings and Fasteners: All mating surfaces of the pump and motor shall be machined and fitted with BUNA-N O-Rings where water sealing is required. Sealing shall be accomplished by the proper fitting of the parts not by compression or special torque requirements. All fasteners shall be 304 stainless steel.

216-2.1.2.4 Shaft and Bearings: The pump shaft shall be AISI 420 stainless steel supported by either two heavy duty single row ball bearings on 1.3 - 2.4 hp pumps, or a lower heavy duty double row ball bearing and an upper heavy duty single row ball bearing on 3.5 - 4 hp pumps.

216-2.1.2.5 Shaft Seals: Each pump shall be equipped with two (2) seals. The lower seal (pump side) shall be of the mechanical type with silicon carbide faces and Buna-N elastomers. The upper seal shall be a Buna-N lip type seal. The seals shall be separated by an oil chamber providing cooling and lubrication of the seals, and a barrier between the pumped fluid, and the dry motor chamber.

216-2.1.2.6 Seal Failure Warning System: A probe shall be provided in the oil chamber to detect the presence of water in the oil. A solid-state device mounted in the pump control panel or in a separate enclosure shall send a low voltage, low amperage signal to the probe. If water enters the oil chamber in sufficient quantity to warrant concern, the probe shall activate a warning light in the control panel.

216-2.1.3 Motor Construction

The motor shall be air-filled and shall have Class "F" insulation. The rotor and stator shall be enclosed in a cast iron outer housing. Bi-metallic thermal switches shall be imbedded in each phase of the winding to sense high temperature. The rating of the switch shall be 130°C +/- 5°C. The control circuit shall be connected through the bi-metallic switches so the motor is shut down should a high temperature condition exist. The switches shall be self-resetting when the motor cools. Power cable shall be UL and CSA approved.

216-2.1.4 Approvals

All models shall be UL and CSA approved. Explosion proof models shall be FM approved for Class I Division I Group C and D.

SECTION 216-2.2 MADRONA MARSH PUMP SYSTEM

216-2.2.1 General: General: Furnish two ABS Model XFP 100E-CB1 PE105/4 submersible non-clog wastewater pump(s). The pump(s) shall be supplied with a mating cast iron four inch discharge connection and be capable of delivering 410 U.S. GPM at a total dynamic head of 80 feet. An additional point on the same curve shall be 200 U.S. GPM at a total dynamic head of 95 feet. Shut off head shall be 110 feet (minimum). The motor shall be an integral part of the pump unit. The motor shall be 14.1 HP connected for operation on a 230 volt, 3 phase, 60 hertz electrical supply service. Pumps intended for wet pit installation shall be supplied with a standard cast iron guide rail system with an integrated four inch discharge elbow. Pumps intended for dry pit installation shall be supplied with a steel mounting frame. Each pump unit shall be fitted with a stainless steel wire rope assembly, 30 feet long for lifting the pump. The working load rating of the lifting system shall be a minimum of 50% greater than the pump weight. Each pump motor shall be equipped with 65 feet of power and control cable sized in accordance with NEC and CSA standards.

Contractor shall salvage and return to the City the existing pumps.

216-2.2.2 Pump Design: The heavy duty submersible wastewater pump(s) shall be capable of handling raw unscreened sewage, storm water, and other similar solids-laden fluids without clogging. The pump shall be driven by a **Premium Efficiency motor**, providing the highest levels of operational reliability and energy efficiency.

216-2.2.3 Guide Rail Base Assembly (wet pit installation): There shall be no need for personnel to enter the wet well to remove or reinstall the pump(s). In a wet pit installation, the discharge base & elbow assembly shall be permanently installed in the wet well and connected to the discharge piping. In order to prevent binding or separation of the pump from the guide rail system, the pump(s) shall connect to the guide rail base automatically and firmly, guided by one 2 inch guide pipe (two 2 inch pipes optional) extending from the base elbow to the top of the station. Systems using guide cable in lieu of rigid guide bars or pipes shall not be considered acceptable. The sliding guide bracket shall be a separate part of the pumping unit, capable of being attached to standard 4 inch ANSI class 125 or metric DN100 pump flanges, so that the pump mounting is non proprietary, and any pump with a standard discharge flange can be mounted on the base assembly. Base or bracket

assemblies with proprietary or non standard flange dimensions shall not be considered acceptable.

A field replaceable Nitrile (Buna-N) rubber profile gasket or o-ring shall accomplish positive sealing of the pump flange/guide rail bracket to the discharge elbow. Base assemblies which rely solely on metal to metal contact between the pump flange and discharge base elbow as a means of sealing are inherently leak prone, and shall not be considered equal. No portion of the pump shall bear directly on the floor of the sump. The guide rail system shall be available in an optional non-sparking version, approved by Factory Mutual for use in NEC Class 1, Division 1, Group C&D hazardous locations.

216-2.2.4 Base Assembly (dry pit installation): In a dry pit installation, the pump shall be secured to a steel support stand of suitable strength to support the weight of the pump and resist any expected torsion, bending, or vibration forces. The pump shall be suitable for either vertical or horizontal dry pit installation without requiring any internal modifications.

216-2.2.5 Pump Construction: Major pump components shall be of gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) with smooth surfaces devoid of porosity or other irregularities. All exposed fasteners shall be stainless steel 1.4401 (AISI type 316) construction. All metal surfaces coming into contact with the pumped media (other than the stainless steel components) shall be protected by a factory applied spray coating of zinc phosphate primer followed by a high solids two part epoxy paint finish on the exterior of the pump. The pump shall be equipped with an open lifting hoop suitable for attachment of standard chain fittings, or for hooking from the wet well surface. The hoop shall be stainless steel 1.4401 (AISI 316), and shall be rated to lift a minimum of four times the pump weight.

Sealing design for the pump/motor assembly shall incorporate machined surfaces fitted with Nitrile (Buna-N) rubber O-rings. Sealing will be the result of controlled compression of rubber O-rings in two planes of the sealing interface. Housing interfaces shall meet with metal to metal contact between machined surfaces, and sealing shall be accomplished without requiring a specific torque on the securing fasteners. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered equal. No secondary sealing compounds shall be required or used.

216-2.2.6 Impeller: The ABS ContraBlock Plus impeller shall be of gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B). The impeller shall be of the semi-open, non-clogging, single vane design, meeting the Ten State Standards requirement for minimum solids passage size of 3 inches. The impeller shall be capable of passing a minimum of 3.1 inch diameter spherical solids as are commonly found in waste water. The impeller shall have a slip fit onto the motor shaft and drive key, and shall be securely fastened to the shaft by a stainless steel bolt which is mechanically prevented from loosening by a positively engaged ratcheting washer assembly. The head of the impeller bolt shall be effectively recessed within the impeller bore to prevent disruption of the flow stream and loss of hydraulic efficiency. The impeller shall be dynamically balanced to the ISO 10816 standard to provide smooth vibration free operation. Impeller designs which do not meet the Ten State Standards requirement for 3 inch solids passage size, those that rely on retractable impeller designs to pass 3 inch solids, or those that rely on fins or pins

protruding into the suction path to assist in the handling of fibrous material shall not be considered equal.

216-2.2.7 Self Cleaning Wear Plate: The ABS ContraBlock Plus wear plate shall be constructed from gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B). The wear plate shall be designed with an inlet incorporating strategically placed cutting grooves and an outward spiral V-shaped groove on the side facing the impeller, to shred and force stringy solids outward from the impeller and through the pump discharge. The wear plate shall be mounted to the volute with three stainless steel securing screws and three stainless steel adjusting screws to permit close tolerance adjustment between the wear plate and impeller for maximum pump efficiency. The wear plate shall be factory mounted to the volute in a fixed position with metal to metal contact on machined surfaces to insure optimal clearance and efficiency at startup. Future adjustments shall be easily accomplished by removing three securing screws and rotating the plate 45 degrees to the adjustment position. Adjustment to allow for wear and restore peak pumping performance shall then be accomplished using standard tools, and without requiring disassembly of the pump. The use of fixed or non-adjustable wear plates or rings, or systems that require disassembly of the pump or shimming of the impeller to facilitate adjustment shall not be considered equal. The suction flange shall be integrated into the wear plate and its bolt holes shall be drilled and threaded to accept standard 4 inch ANSI class 125 flanged fittings.

216-2.2.8 Pump Volute: The pump volute shall be single piece gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) non-concentric design with centerline discharge. Passages shall be smooth and large enough to pass any solids which may enter the impeller. Discharge size shall be as specified on the pump performance curve. The discharge flange design shall permit attachment to standard ANSI or metric flanges/appurtenances. The discharge flange shall be slotted to accept both 4 inch ANSI class 125 and metric DN100 (PN 10) metric flanged fittings. Proprietary or non standard flange dimensions shall not be considered acceptable. The minimum working pressure of the volute and pump assembly shall be 10 bar (145 psi).

216-2.2.9 Premium Efficiency Motor : The Premium Efficiency motor shall meet efficiency standards in accordance with IEC 60034-30, level IE3 and NEMA Premium*. Motor rating tests shall be conducted in accordance with IEC 60034-2-1 requirements and shall be certified accurate and correct by a third party certifying agency. A certificate shall be available upon request. IE3 and NEMA Premium efficiency levels are equivalent, however the NEMA Premium standard is intended to cover dry installed motors only, not integrated submersible motors.

The Premium Efficiency motor shall be housed in a water tight gray cast iron, EN-GJL-250 (ASTM A-48, Class 35B) enclosure capable of continuous submerged operation underwater to a depth of 20 meters (65 feet), and shall have an IP68 protection rating. The motor shall be of the squirrel-cage induction design, NEMA type B, Premium Efficiency. The copper stator windings shall be insulated with moisture resistant Class H insulation materials, rated for 180°C (356°F). The stator shall be press fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is unacceptable. The rotor bars and short circuit rings shall be made of cast aluminum. The motor shall be designed for continuous duty. The maximum continuous temperature of the pumped liquid shall be 40°C (104°F), and intermittently up to 50°C (122°F). The motor shall be capable of handling up to 15 evenly spaced starts per hour without

overheating. The service factor (as defined by the NEMA MG1 standard) shall be **1.3** in wet pit service and 1.15 in dry pit service. The motor shall have a voltage tolerance of +/- 10% from nominal, and a phase to phase voltage imbalance tolerance of 1%. The motor shall be FM and CSA approved for use in NEC Class I, Division I, Groups C & D hazardous locations. The surface temperature rating shall be T3C. The motor shall meet the requirements of NEMA MG1 Part 30 and 31 for operation on PWM type Variable Frequency Drives.

The motor shall be capable of operating, completely submerged, partially submerged, or unsubmerged. For submerged (wet pit) applications, the motor shall be self cooling via the process fluid surrounding the motor. For unsubmerged (dry pit) applications, an integrated oil cooling system shall be utilized to enhance heat transfer, and allow the motor to operate at full rated power continuously without the need for de-rating or reduced duty cycle. No external coolant supply or external cooling jacket shall be required for dry pit applications. The motor shall have a NEMA Class A temperature rise for submerged service, and class B rise for dry pit service, providing cool operation under all operating conditions.

216-2.2.10 Thermal Protection: Each phase of the motor shall contain a normally closed bi-metallic temperature monitor switch imbedded in the motor windings. These thermal switches shall be connected in series and set to open at 140°C +/- 5°C (284°F). They shall be connected to the control panel, and used in conjunction with, and supplemental to, external motor overload protection.

216-2.2.11 Mechanical Seals: Each pump shall be equipped with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary industrial duty **silicon-carbide** seal ring and one rotating industrial duty **silicon-carbide** seal ring. The stationary ring of the primary seal shall be installed in a seal holding plate of gray cast iron EN-GJL-250 (ASTM A-48, Class 35B). The seal holding plate shall be equipped with swirl disruption ribs to prevent abrasive material from prematurely wearing the seal plate. The upper, secondary seal unit, located between the lubricant chamber and motor housing, shall contain one stationary industrial duty **silicon-carbide** seal ring, and one rotating one rotating industrial duty **silicon-carbide** seal ring. Each seal interface shall be held in contact by its own spring system. The seals shall not require routine maintenance, or adjustment, and shall not be dependent on the direction of rotation for proper sealing. Each pump shall be provided with a lubricant chamber for the shaft sealing system which shall provide superior heat transfer and maximum seal cooling. The lubricant chamber shall be designed to prevent overfilling, and to provide lubricant expansion capacity. The drain and inspection plug shall have a positive anti-leak seal, and shall be easily accessible from the outside of the pump. The seal system shall not rely upon the pumped media for lubrication and shall not be damaged when the pump is run dry. Lubricant in the chamber shall be environmentally safe non toxic material.

The following seal types shall not be considered equal: Seals of proprietary design, or seals manufactured by other than major independent seal manufacturing companies. Seals requiring set screws, pins, or other mechanical locking devices to hold the seal in place, conventional double mechanical seals containing either a common single or double

spring acting between the upper and lower seal faces, any system requiring a pressure differential to seat the seal and ensure sealing.

216-2.2.12 Mechanical Seal Protection System: The primary mechanical seal shall be protected from interference by particles in the waste water, including fibrous materials, by an active Seal Protection System integrated into the impeller. The back side of the impeller shall be equipped with a sinusoidal cutting ring, forming a close clearance cutting system with the lower submersible motor housing or seal plate. This sinusoidal cutting ring shall spin with the pump impeller providing a minimum of 75 shearing actions per pump revolution. Large particles or fibrous material which attempt to lodge behind the impeller, or wrap around the mechanical seal shall be effectively sheared by the active cutting system into particles small enough to prevent interference with the mechanical seal. The Seal Protection System shall operate whenever the pump operates, and shall not require adjustment or maintenance in order to function. Submersible pump designs which do not incorporate an active cutting system to protect the primary mechanical seal shall not be considered acceptable for wastewater service.

216-2.2.13 Seal Failure Early Warning System: The integrity of the mechanical seal system shall be continuously monitored during pump operation and standby time. An electrical probe shall be provided in a sensing chamber positioned between the primary and secondary mechanical seals for detecting the presence of water contamination within the chamber. The sensing chamber shall be filled with environmentally safe non toxic oil. A solid-state relay mounted in the pump control panel or in a separate enclosure shall send a low voltage, low amperage signal to the probe, continuously monitoring the conductivity of the liquid in the sensing chamber. If sufficient water enters the sensing chamber through the primary mechanical seal, the probe shall sense the increase in conductivity and signal the solid state relay in the control panel. The relay shall then energize a warning light on the control panel, or optionally, cause the pump shut down. This system shall provide an early warning of mechanical seal leakage, thereby preventing damage to the submersible pump, and allowing scheduled rather than emergency maintenance. Systems utilizing float switches or any other monitoring devices located in the stator housing rather than in a sensing chamber between the mechanical seals are not considered to be early warning systems, and shall not be considered equal.

216-2.2.14 Shaft: The pump shaft and motor shaft shall be an integral, one piece unit adequately designed to meet the maximum torque required at any normal start-up condition or operating point in the system. The shaft shall have a full shutoff head design safety factor of 1.7, and the maximum shaft deflection shall not exceed .05 mm (.002 inch) at the lower seal during normal pump operation. Each shaft shall be stainless steel 1.4021 (AISI 420) material, and shall have a polished finish with accurately machined shoulders to accommodate bearings, seals and impeller. Carbon steel, chrome plated, or multi piece welded shafts shall not be considered adequate or equal.

216-2.2.15 Bearings: Each pump shaft shall rotate on high quality permanently lubricated, greased bearings. The upper bearing shall be a deep grooved ball bearing and the lower bearings shall be a heavy duty double row angular contact ball bearing. Bearings shall be of sufficient size and properly spaced to transfer all radial and axial loads to the pump housing and minimize shaft deflection. L-10 bearing life shall be a minimum of 50,000 hours at flows ranging from $\frac{1}{2}$ of BEP flow to $1\frac{1}{2}$ times BEP flow (BEP is best efficiency point). The bearings shall be manufactured by a major internationally known

manufacturer of high quality bearings, and shall be stamped with the manufacturer's name and size designation on the race. Generic or unbranded bearings from other than major bearing manufacturers shall not be considered acceptable.

216-2.2.16 Power Cable: The power cables shall be sized according to NEC and CSA standards and shall be of sufficient length to reach the junction box without requiring splices. The outer jacket of the cable shall be oil and water resistant, and shall be capable of continuous submerged operation underwater to a depth of 65 feet.

216-2.2.17 Cable Entry System: The cable entry system shall consist of a submersible plug assembly which allows the cable be easily disconnected from the pump for service or replacement. Cable sealing shall be accomplished by a Nitrile compression grommet with both cylindrical and conical sealing surfaces, flanked by a stainless steel washer and an integrated strain relief. A brass (C3604) compression nut shall be threaded into to the cast iron EN-GJL-250 (ASTM A-48, Class 35B) cable plug housing, compressing the grommet ID to the cable while the grommet OD seals against the bore of the cable entry housing. Cable conductors shall be terminated in copper pin connectors which are separated and retained by a circular pin retainer fabricated from high dielectric strength Polyamid (30% GF). Each pin shall pass through its own hole in the pin retainer, maintaining perfect alignment with the mating pins in the motor body. The corresponding motor body pin assembly shall be manufactured from high dielectric strength Polyamid (30% GF), with copper connector pins. The pin assembly shall be sealed with an o-ring to prevent water entry into the motor, and retained in the motor housing bore via a retaining ring. Attachment of the plug assembly to the motor shall engage the corresponding copper pins, creating a complete circuit between the motor and cable. The plug assembly shall be fastened with stainless steel fasteners, and shall be sealed by an o-ring.

The cable plug and sealed entry system as part of the motor shall be FM and CSA approved for use in NEC Class I, Division I, Groups C & D hazardous locations. The system shall be anti wicking by design, and shall prevent any water that enters the cable through damage to the jacket from entering the motor. Cable entry designs which utilize potting compounds to provide a water tight seal, or those which do not allow the cable to be easily changed in the field shall not be considered equal.

216-3 Electrical Control Panel

216-3.1 Intent of Specification

It is the intention that this specification shall cover a complete Triplex Pump Lift Station Electrical Control System as hereinafter described and all necessary appurtenances which might normally be considered a part of the complete electrical system for this installation. All of the automatic control equipment is to be supplied by one manufacturer. It shall be factory assembled, wired and tested and covered by complete electrical drawings and instructions.

The control system described hereafter is a Model Powerpack FP4-Triplex Control System as manufactured by Siemens Water Technologies - Control Systems of St. Paul, MN. The naming of a manufacturer of equipment in this specification is not intended to eliminate competition or prohibit qualified manufacturers from offering equipment. Rather, the intent

is to establish a standard of excellence for the material used, and to indicate a principle of operation desired. The contractors bid shall be based on the use of Siemens Water Technologies - Control Systems equipment. Unless the bidder clearly indicates in his bid that he is offering an equal product approved by the engineer via a pre-bid submittal, the bid shall be considered as providing the brand name product referenced in the specifications above. It is important for all bidding contractors to note that if alternate proposals based on substituted systems are to bid, they must be prequalified by the consulting engineer fifteen (15) days in advance of the bid date. In the event a prequalified system is installed by the Contractor and does not meet the specified intent of this specification with regard to reliability, efficiency, functional capability, or other system parameters, the Consultant may reject the alternate system. In such instance, the Siemens Water Technologies - Control System originally specified must be furnished. The Engineer may exercise this option at any time during the project tenure. Project tenure is defined as beginning the date the project bids and ending on the date the system has operated satisfactorily for one year after final acceptance.

Signal conditioning, setpoint, control, alternation, logic function, transducer, alarm and all other control functions shall be performed by solid-state modules which shall be standard catalog items of the system manufacturer, with proven field performance.

At least one module of each type used in the system shall be stocked by the system manufacturer for system expansions or renewal parts purposes. The modules shall be of a compatible, integrated control family with a full range of control/protective/alternation/telemetry capabilities and associated housings, enclosure system and appurtenances to perform a variety of functions required by this project and foreseeable expansion. It is the intention of this specification to disallow non-standard, "one of a kind", experimental, unproven combinations of equipment.

The level sensors shall be standard products manufactured and stocked by the control supplier in order to assure one source responsibility, ready availability, proper system interconnections and reliable, long-term operation.

216-3.2 System Coordination and Single Source Responsibility

The equipment provided shall be a completely integrated automatic control and monitoring system consisting of the required automation and alarm monitoring equipment in a factory wired and tested assembly. The automatic control and alarm/monitoring system components shall be standard, catalogued, stocked products of the system supplier to assure one source responsibility, immediately available spare/replacement parts, proper system interconnections and reliable long term operation.

All equipment and materials shall be subject to the Engineer's review and shall not be purchased or manufactured until the review is complete.

The Supplier shall prepare detailed design information, procure, configure, install, start-up, make ready for use, the complete instrumentation's systems as indicated on the Plans and in each of these Specifications. These Specifications and drawings include descriptions of functional operation and performance, as well as standards, but do not necessarily enumerate detailed specifications for all components and devices that are essential for system operation. However, all components and devices shall be furnished and installed

as required to provide complete and operable systems for accomplishing the functions and meeting the performance set forth hereinafter.

The system shall be installed by the Supplier complete and ready to operate, including all necessary connections to sources of electrical power, interconnection between field equipment and accessories as specified or as recommended for best operation for the equipment furnished. The hardware that is installed in the control and monitoring system shall be readily available. None of the hardware in the system shall be part of a discontinued line or classified as hardware that is on repair status only. The Supplier shall provide documentation verifying the continuing availability of the system hardware for full integration of the original hardware with future hardware improvements. All necessary mounting panels, stands, hangers, and brackets shall be furnished and installed and shall comply with the relevant sections of the Specifications.

The Supplier shall include in the bid allowance for factory-trained service personnel to supervise and install, adjust all the equipment until the system has been completely accepted.

216-3.3 Quality Assurance

The Supplier shall maintain quality in both design and workmanship as well as materials used in manufacture of equipment supplied. All equipment supplied under this Contract shall be of new manufacture.

The Supplier shall be a firm that is engaged in the manufacturing of process control systems. The system shall be in regular production with pre-designed hardware and software for process control systems. When the specification conflicts with a manufacturer's standard system, the standard system may be furnished if the intention of the specification is met.

System shall be a standard system. Custom one of a kind application software and customized hardware components will not be accepted. A standard system is defined as one which is available, at time of bid, with fully tested hardware and software, full documentation, and prepared training classes such that no development must be done beyond system configuration.

Supplier shall be responsible for detailed engineering, manufacture, programming, test, start-up and demonstration of all equipment and software programs to provide a complete operating system.

The Supplier shall have been continuously involved in the design and manufacture of control systems for the past ten-(10) years. The Supplier shall have successfully built and placed into operation, system similar to the one proposed herein and will furnish a list of at least ten (10) operating installations upon request by the Engineer. The Supplier shall have on staff at least ten (10) qualified instrument technicians and shall maintain a stock inventory of spare parts for all major components in the system.

The Supplier shall be responsible for engineering and implementing necessary interface between the supplied equipment and the existing equipment or interface junction boxes. Supplier shall document this interface including point-to-point wiring diagrams.

Provide all engineering and render coordination assistance, necessary for calibration of overall control system and to resolve interface discrepancies between panels, equipment, instrumentation and final control devices. Where interface conflicts exist, the Supplier shall

document conflicts in writing to the City providing absolute information such as terminal numbers, device name, tests performed and diagnosis of problem.

All of the equipment listed herein shall be furnished by a single supplier.

All equipment supplied shall be of the most current and proven design at the time of delivery. The completed System and the equipment provided by the Supplier shall be compatible with the functions required and shall be a complete working System.

All electrical components of the System shall operate on 120 volt, single- phase, 60 Hertz current, except as otherwise noted in the specifications and on the drawings.

The Supplier shall be Siemens Water Technologies - Control Systems, or equal.

216-3.4 Documentation

The complete assembly shall be provided with job-specific wiring diagrams, parts lists, enclosure dimensional and door layout drawings and instructions.

Shop Drawings shall be submitted for approval for all equipment herein specified. The Shop Drawing Submittal shall include a Document List. An Order Specification shall be included which shall describe in detail all equipment provided. Each panel shall be provided with a job-specific wiring diagram, parts list, enclosure door layout and enclosure dimension drawing. Manufacturer's wiring diagrams that are not job-specific (standard drawings with options crossed out, etc.) are not acceptable. The wiring diagram requirement applies to all field mounted instrumentation and control equipment. Interconnection details shall be shown for all field mounted instrumentation. A Description of Operation shall be provided detailing the operation of the complete system, including the control and alarm handling.

Provide As-built Drawings and Instruction Manuals. These manuals shall include corrected Shop Drawings. In addition, a detailed Programming and Operations Manual for the Microprocessor-based Controller Unit shall be included. The manual shall include all information as detailed for the Shop Drawing Submittals above.

216-3.5 Information Required for Alternate Manufacturer

The bidder shall include all expenses necessitated by use of non-specified equipment in his bid price.

1. Full description and performance data on all substitute items proposed with references for verification of performance for such equipment already in service, all data in triplicate.

2. Detailed description of how the proposed substitute differs from that specified including but not limited to materials of construction, fabrication, operation, warranty, service, corrosion protection, power consumption, maintenance requirements, etc.

3. Detailed discussion of why the proposed substitute is equal or superior to that specified in material of construction, fabrication, operation, warranty, service, corrosion protection, power consumption, maintenance requirements, etc.

4. Tracings and four copies of revised prints reflecting in detail any and all changes in arrangements for materials, equipment, piping, fabrication, erection, maintenance, power supply, etc.

5. Name and telephone number of person(s) to contact to answer questions or supply additional information.

216-3.6 General Equipment Requirements

216-3.6.1 U.L. Serialized Label

The control panel(s) shall be constructed in compliance with Underwriter's Laboratories Categories 698A and 913 standards – "Enclosed Industrial Control Panel Relating to Hazardous Locations with Intrinsically Safe Circuit Extensions" listing and following-up service. The control panel(s) shall bear the Underwriter's Laboratories serialized label for "Enclosed Industrial Control Panel Relating to Hazardous Locations with Intrinsically Safe Circuit Extensions".

Prior to shipment from the manufacturer's facility to the jobsite for installation, an Underwriter's Laboratories (U.L.) representative shall inspect the completed control panel(s). Upon successful completion of the inspection, the panel shall be assigned the required "Enclosed Industrial Control Panel Relating to Hazardous Locations with Intrinsically Safe Circuit Extensions" serialized U.L. label, indicating the equipment is built in accordance with the practices and requirements of the Underwriter's Laboratories 698A and 913 categories.

While the use of U.L. listed components is encouraged, their use alone and/or the alternate use of a U.L. 508A – "Enclosed Industrial Control Panel" serialized label will not be considered an acceptable or satisfactory alternate to the "Enclosed Industrial Control Panel Relating to Hazardous Locations with Intrinsically Safe Circuit Extensions" serialized label specified above. Upon request from the Engineer, the panel manufacturer shall supply documentation to the owner proving they are a U.L. recognized manufacturing facility for the type of equipment required. Only the labeled products of U.L. 698A and 913 "Enclosed Industrial Control Panel Relating to Hazardous Locations with Intrinsically Safe Circuit Extensions" recognized panel manufacturer shall be considered acceptable for use on this project.

216-3.6.2 Wiring

All wiring shall be minimum 600 volt UL type MTW or AWM and have a current-carrying capacity of not less than 125% of the full load current. The conductors shall be in complete conformity with the national electric codes, state, local and NEMA electrical standards. For ease of servicing and maintenance, all wiring shall be color coded. The wire color code shall be clearly shown on the drawings, with each wire's color indicated.

All control wiring shall be contained within plastic/PVC wiring duct with covers. Where dimensional constraints prevent the use of wiring duct, wires shall be trained to panel components in groupings. The wire groupings shall be bundled and tied not less than every 3 inches with nylon self-locking cable ties as manufactured by Panduit or equal.

Every other cable tie shall be fastened to the enclosure door or inner device panel with a cable tie mounting plate with pressure tape. Where wiring crosses hinged areas such as when trained from the inner device panel to the enclosure door, spiral wrap shall be used.

216-3.6.3 Incoming Service and Lighting Arrestor

The lift station control panel shall be service entrance rated. Conduit and wiring between the power company termination and the lift station shall be furnished and installed by the contractor. The power supply will be 480 volts, 3 phase, 3 wire, 60 Hertz.

A lightning arrestor shall be supplied in the control system and connected to each line of the load side of main power disconnect. The arrestor shall protect the control system against damage as the result of transient voltage surges caused by lightning interference, switching loads and power line interference's. It shall begin shunting to ground at 1000 volts maximum.

All metering shall be done ahead of the main disconnect and control panel. The meter shall be installed by the Contractor in accordance with local power company requirements.

Each panel shall be supplied with a properly sized control power circuit breaker. The breaker shall supply power to all control wiring within the enclosure.

216-3.6.4 Nameplates

1. All major components and sub-assemblies shall be identified as to function with laminated, engraved bakelite nameplates, or similar approved means.

216-3.7 Control System and Control Panel

216-3.7.1 Enclosure

The described equipment shall be housed in a NEMA 4X 304 Stainless Steel. Unit shall measure 36" wide, 48" high, 12" deep. The enclosure door shall be provided with aluminum dead front operator's inner door.

This weatherproof, rain-tight enclosure shall be designed specifically for mounting in an unprotected outdoor location. It shall have a gasketed, hinged, front weather door with locking capability, and an internally mounted hinged dead front panel so that all the components normally actuated by Operating Personnel are accessible without opening the dead front and yet are not exposed to the elements or to unauthorized personnel.

The enclosure shall be supplied with 18" floor stands and louvered skirts to cover incoming conduit made out of the same material as the enclosure.

216-3.7.2 Incoming Power Circuit Interrupts

The control panel shall include a thermal magnetic main circuit breaker to provide an incoming power disconnect means and short circuit/overcurrent protection for the control panel equipment

The circuit breaker must have a minimum symmetrical RMS ampere interrupting capacity of 18,000 @ 460 volt. The circuit breaker shall be operable through the operator's door of the enclosure and shall have a trip rating to allow full voltage starting and continuous operation of the motors.

The commercial power input to the control panel/main breaker shall be UL service entrance rated and labeled.

The control panel shall include a control power transformer for converting the high voltage incoming three phase service to 120 VAC single phase power. The 120 VAC power shall be used to power internal control components and the 15 amp rated GFI duplex receptacle. The control power transformer shall be rated for 230/460-120 VAC single phase at 2 KVA with Class 105 Deg. C insulation and shall be UL Listed. The control power transformer shall be supplied with primary and secondary fusing.

216-3.7.3 Phase Failure/Undervoltage Pump Protection

A power monitor shall be provided to monitor incoming voltage and provide protection to the motors. The power monitor shall detect incoming service abnormalities including phase-loss, unbalance, reversal, over voltage, under-voltage and rapid cycling protection and provide automatic cutout of pumps and provide local alarm. Upon detection that incoming power has returned to normal, the unit will restore pump operation and discontinue alarm. The power monitor shall be protected against overcurrent by the use of separately mounted extractor-type line voltage fuses. This device shall have a nominal 2-4 second dropout delay and (2-300 second) adjustable restoration time delay.

The power monitor shall have built in dual color LED indicator. The indicator shall be green when system is normal and shall turn red upon detection of improper three phase power. The unit shall protect itself from voltage spikes and transients with internal transient protection meeting IEEE 587 standards.

The power monitor system shall also include a stagger time delay function providing time delay between lead and lag pump start to eliminate simultaneous starting of motors upon return of system power. This feature shall be operation in all modes of pump operation.

216-3.7.4 Branch Circuit Breakers and Motor Starters

A thermal magnetic circuit breaker shall be supplied as branch circuit protection for each pump motor. The circuit breaker must have the same minimum ampere interrupting capacity as the main breaker. The circuit breakers shall be operable through the operator's door of the enclosure and shall have a trip rating to allow full voltage starting and continuous operation of the motors.

A NEMA rated, full-voltage, across-the-line magnetic motor starter with ambient-compensated, quick-trip class 10 overload sensing for submersible pumps in each phase to provide over current and running protection shall be provided for each pump motor. The overload trip setting shall be operator adjustable within normal pump operating ranges. Operator's door mounted overload reset push-buttons shall be provided.

120 VAC control power for each motor starter coil and H-O-A selector switch shall be provided.

A control power circuit breaker shall be provided and operable through the operators door of the control panel to provide a disconnect means and short circuit protection for any 120 VAC (or less) devices not powered from motor starter circuits.

Combination motor starters shall be furnished for the following motors:

| Motor | HP | FLA | NEMA Starter Size | Ckt Bkr Trip |
|--------------|-----------|------------|--------------------------|---------------------|
| Motor 1 | 15 | 21 | 2 | 40 |
| Motor 2 | 15 | 21 | 2 | 40 |
| Motor 3 | 3 | 4.8 | 0 | 15 |

216-3.7.5 Pump Control Selector Switches and "RUN" Lights

The control panel shall have three position selector switches mounted on the front door for Hand-Off-Auto operation of each pump. In the Hand position the motor shall be called to operate. In the Off mode the motor shall not be allowed to operate. In the Auto mode, the motor shall operate in response to control signals from the controller.

Selector Switch(s) shall be industrial rated heavy duty NEMA 4 with modular contact block assemblies. Contact Blocks shall be stacking snap on type with parallel double break contacts with wiping action. Contact blocks shall be rated NEMA A600, 600 Volt, 10A continuous duty, 7200VA make, 720VA break AC. Contacts shall have compression type screw terminals with self lifting spring washers to insure that the wire remains secure even under sever vibration. Each contact block shall meet "touchsafe" requirements of IEC.

Unless specified otherwise, Selector Switch(s) shall be of the maintained position.

An operator's door mounted, 30.5 mm diameter, NEMA Type 4X oil tight pilot light with a "Green" lens and replaceable bulb shall be provided for each pump to indicate a "pump running" condition.

216-3.7.6 Pump Running Time Meters

An operator's door mounted, 120 VAC powered running time meter measuring hours and tenths of hours of operation up to 99999.9 hours shall be furnished for each pump motor indicated.

216-3.7.7 Controller

A Pump Controller shall be furnished to automatically provide wet well level alarm monitoring and control of pumps based on float switch inputs. The controller shall be flexible for future considerations and come preconfigured with multiple modes of control for up to 3 pumps in either a pump up or pump down mode of operation as based on up float switch inputs. Operation mode shall be easily adjusted by the operator via built in rotary switch. No special tools or programming shall be required to change operation modes. This application will utilize duplex pump down mode control based on 5 float inputs representing common pump stop, lead, Lag, Lag-Lag pump required, and high level alarm.

The Pump Controller shall allow easy operator selection of pump sequences via built in switch. Operator shall be able to operate pumps in a fixed pump sequence or alternating sequences. The controller shall allow operator removal of pumps from operation for service or repair via built in switch adjustments.

The Pump Controller shall have user adjustable built in delay timers to prevent inadvertent starting and stopping of pumps and prevention of nuisance alarms based on momentary signal input(s). Time delay shall also protect motors from operating too quickly after a power failure and allow power to stabilize before allowing motors to start. The timer should allow a minimum adjustable time delay period of 1-255 seconds allowing delay flexibility for each specific station.

The Pump Controller shall have built in float input sequence failure logic. The presence of this alarm shall signify a possible float switch failure, tangling or wiring problem. Upon detection of this failure, the audible alarm output shall be activated.

The Pump Controller shall interface to motor starter pilot circuits and alarm circuitry via built in relay outputs. Each output shall have a minimum contact rating of 7 Amps @ 240 VAC ensuring reliable and long life operation of inductive loads such as motor starters and solenoids. All outputs shall be form A with the exception of the audible alarm output, this shall have a form C contact allowing fail safe configurations. The controller shall be able to accept an external alarm acknowledge signal that will inhibit (Silence) the audible alarm output. The audible alarm output shall be activated upon detection of high, low or (Float Switch) out of sequence alarm.

The Pump Controller shall be able to accept a discrete input for inhibiting the operation of the pumps. Upon activation of the input, the controller will disable only the pump required outputs and will flash the associated output activation LED to indicate external inhibit. Level alarms shall still activate alarm outputs. Upon release from the inhibit signal, the pumps that are required will be allowed to restart while enforcing the start delay.

The Pump Controller shall be supplied with local status indication, via long life LEDs, of float input status and control and alarm output status. LEDs shall be illuminated when the associated input or output is active. LEDs shall be located on the front of the controller so they are easily viewed.

The Pump Controller shall operate on 120 VAC power source, be UL 913 listed for intrinsically safe operation in Class I, Divisions 1 & 2, Groups A,B,C,D operation and be

certified to CE 61000-4 standards for electro-static discharge, radio frequency, and fast transient immunity.

Pump Controllers that require programming software to make changes and do not provide the above flexibility will not be accepted. The controller shall be a Model CB1000 as manufactured by Siemens Water Technologies.

216-3.7.8 Float Switch

The contractor shall furnish, install, and wire the float switches for control as shown on the drawings.

Float switch(s) shall be designed to insure long life and reliable operation in both water and wastewater applications. Float switch body shall be constructed of Teflon coated 20 Ga. 316 stainless steel housing measuring not less than 5 ½" in diameter. A long life, high reliability, potted SPST magnetic reed switch rated for not less than 100 VA at up to 250 Volts shall be mounted inside the float and connected to a multi-stranded, 2 conductor plus ground, 16 gauge, CPE jacketed cable. The cord shall have fine strand conductors (Not more than 34 Gauge) made especially for heavy flexing service. The cable connection point shall be potted in epoxy providing a strong bond to the float and reed switch forming a water/moisture tight connection. A flexible Neoprene sleeve, not less than 1/8" thick, shall be provided over the CPE jacketed cable extending not less than 5" from the top of the mounting bracket extending down through the cable mounting bracket hinge point to the top of the float switch body, providing cable stress point relief and extended operational life.

A 316 SS ring flanged cable mounting clamp assembly shall be supplied allowing pipe or cable mounting as specified below. The float cable-mounting bracket shall be flared on both sides providing hinge point stress relief to both sides of the cable.

The float switch assembly shall provide a minimum of two pounds of buoyancy in solutions with a specific gravity of 1.0 (water) and shall have an operating temperature rating of -35 to +90 Deg. C.

The float switches shall be Model 9G-EF Floats as manufactured by Siemens Water Technologies..

216-3.7.9 Convenience Receptacle

1. An operator's door mounted 120 VAC duplex ground fault interrupter (GFI) type, convenience receptacle rated at 15 amperes shall be supplied for the operation of a trouble light, drill, etc. It shall be protected by a separate 15 ampere trip rated circuit breaker accessible from the operator's door.

216-3.7.10 Local Alarm System

A top mounted weatherproof, strobe alarm indication light assembly with shatter resistant polycarbonate red lens mounted on a polycarbonate/ABS blend case shall be provided. The alarm light shall be NEMA 4X rated, suitable for indoor or outdoor mounting and

operate on 120 VAC and be PLC rated. The strobe tube shall provide a minimum of 300,000 peak candela output and shall be rated for 3,000 hour life.

The alarm light shall flash upon occurrence of an alarm condition.

216-3.7.11 Condensation Protective Heater

A 100 watt, 120 VAC condensation protective heater and adjustable high temperature cutout thermost switch shall be supplied in the control panel. The heater's surface area for heat dissipation shall be large enough to prevent a skin burn (if an operator's hand should inadvertently come in contact with the unit when energized).

216-3.7.12 Over-Temperature Pump Protection & Pump Seal Failure Alarm

Over-temperature protection shall be provided in the control panel to operate in conjunction with the over-temperature switch in each pump motor. The control shall provide pump operation lockout upon the occurrence of high temperature.

The circuitry shall also include a 30.5 mm diameter, NEMA Type 4X, red "pump overtemp" shutdown alarm indicating light (with front replaceable bulb) and a 30.5 mm diameter, NEMA Type 4X, manual reset push-button on the operator's door for each pump motor.

An operator's door mounted 30.5 mm diameter, NEMA Type 4X red seal fail alarm light (with front replaceable bulb) and a panel mounted seal leakage relay (to operate with the pump seal leak sensor) shall be provided to indicate a pump seal failure alarm condition for each sewage pump. The seal leakage relay shall be of solid state design incorporating LED for visual indication of sensor activation. Unit shall include built in low voltage sensor and electrical surge protection. Unit shall be CSA approved and UL recognized.

216-3.8 Field Supervision

The services of a factory trained, qualified representative shall be provided to inspect the completed installation, make all adjustments necessary to place the system in trouble-free operation and instruct the operating personnel in the proper care and operation of the equipment.

After each system has been installed, the Supplier shall demonstrate with simulated I/O the performance of each unit, and document that the system operates properly as specified. Monitoring signals shall register at all required locations and loop checks on all loops shall have been completed and tested. Each station must be tested and accepted by the city prior to proceeding to the next installation.

216-3.9 Training

The Supplier shall provide systems training for operations staff totaling no less than 4 hours.

All training shall be at the customers site location in Madrona Marsh, City of Torrance. All travel and per-diem expense for training will be the responsibility of the Supplier.

216-3.10 Guarantee

All equipment shall be guaranteed against defects in material and workmanship for a period of one year from the date of Owner's final inspection and acceptance to the effect that any defective equipment shall be repaired or replaced without cost or obligation to the Owner.

SECTION 218 SIGNS

Section 218-1 Information Signs – The Contractor shall obtain and install 3 interpretive signs related to the Madrona Marsh and the Madrona Marsh Restoration and Enhancement Project. The Acorn Group, Inc. shall provide two different 36 x 24 x 3/4" phenolic resin panels; one 48 x 36 x 3/4" phenolic resin panel; and the Contractor shall provide and install one powder-coated double post aluminum pedestal for in-ground installation; three sets of inserts and stainless steel screws (assumes existing hardware for map remains in place and one panel is rail-mounted. The Contractor shall replace the overview panel located at the Madrona Marsh entrance, and install a 36"x24" sign and stand at the Subsurface Wetlands Treatment System and install a 36" x 24" sign onto the railing of the Composite Wood Observation Deck. The City has been working with The Acorn Group, Inc., to provide graphics and the signs. The Acorn Group, Inc. can provide the required signs and graphics and their contact information is as follows:

The Acorn Group, Inc.
155 El Camino Real
Tustin, CA 92780

(714) 838-4888
(714) 838-5309 FAX
emailacorn@aol.com
www.acorngroup.com

The Contract Unit price for installing information signs shall include full compensation for all work of obtaining, delivering, storing and installing information signs and mounting fixtures in accordance with the Plans and Manufacturer recommendations.

218-2 No Parking Signs

218-2.1 Sign Specifications. The Contractor shall furnish and install No Parking signs with days and times to be provided by Engineer and as follows:

- Size: Signs shall be 12" x 18"
- Text: Red with "TORRANCE" on the bottom border
- Materials: Made of .080" aluminum with 3M, diamond grade cubed, with protective overlay film 1160
- Warranty: Matched component system warranty of 12 years

218-2.2 Post Specifications. The Contractor shall provide and mount signs to posts as follows:

- U-Channel Post Hot rolled flanged channel produced from high strength rail steel according to ASTM A499-81, Grade 60. Dimensions shall be 3-1/8" x 1.516".

- Length: 10 feet
- Weight: 2 pounds per lineal foot
- Holes: 3/8" diameter on one-inch centers punched full length, beginning 1" from top of post.
- Finish: Hot dipped galvanization per ASTM-A-123

218-2.3 Bracket & Strap Set Specifications. Signs mounted to existing street light poles shall use brackets as follows:

- Brackets (2 per set): Stainless Steel, threaded center hole bracket. For use on street poles 3 inches to 12 inches in diameter.
- Straps (2 per set): Stainless steel, radiator-like clamp for quick mounting of signs. Needs only a screwdriver to tighten, 40-inch strap length.

Mounting Set Hardware shall be as follows:

- Bolt (2 per set): 5/16"x2"; Zinc-plated steel
- Nut (2 per set): 5/16"; Zinc-plated steel (back face mounting)
- Washer (2 per set): 5/16"; nylon (front face mounting)
- Washer (2 per set): 5/16" Zinc-plated steel (back face mounting)

218-2.4 Installation Specifications

Installation should be in ground at a depth necessary to hold the sign firmly in place with a minimum depth of 24". Sign placement will be guided by the locations identified in the map in Appendix A. As much as possible, actual sign locations will be on the property line, if a new pole is being installed. Signs will be targeted to be placed between the curb and sidewalk with a targeted lateral offset of 0.6m (2 ft) from the curb and a minimum lateral offset of 0.3m (1 ft) from the face of the curb. Bracket installation requires a screw mounting or other method to the bracket to ensure that the sign may be replaced on the existing bracket without removing the bracket. Sign placement will be 25' from the corner of the intersection.

218-2.5 Payment

The Contract Unit price for installing No Parking signs shall include all costs for siting sign locations, materials, and installation.

PART 3

CONSTRUCTION METHODS

SECTION 300 – EARTHWORK

300-1 CLEARING AND GRUBBING.

300-1.3 Removal and Disposal of Materials.

Add subparagraphs (d) and (e):

- (d) **Trees.** The City maintains a tree conservation policy. Unless otherwise shown, all trees are to be protected in place. Demolition and destruction of trees and tree parts, including trunks, branches and foliage, shall be limited to tree removals as shown on the Plans. Root pruning and removals shall be limited to the minimum required to construct new improvements where trees are to be conserved.

The Engineer shall place a visible removable "tag" on each tree proposed to be removed at least five (5) work days and no earlier than ten (10) work days prior to removal. Said "tag" is intended to give adjacent residents proof of trees to be removed or saved. Tags shall be on the sidewalk side of trees and located at least five feet (5') above ground.

The Contractor shall remove only trees that have been marked by the Engineer for removal. Trees shall be removed in a workmanlike manner so as not to injure other standing trees, plants, and improvements which are to be preserved.

Stumps shall be ground down three feet (3') below ground surface within five (5) feet of the center of the stump. All surface roots shall be removed within the parkway.

The Contractor shall conform to the following requirements:

- 1) The cutting down or removal of trees is prohibited after the prescribed working hours unless permission is granted by the Engineer.
- 2) All debris from pruning or removing a tree shall be cleaned up and hauled away from the Work site on the same day that the tree is cut or pruned. Firewood-size logs may be left neatly piled for residents to pick up for no longer than three (3) days.
- 3) All holes created from removal of tree stumps shall be backfilled and graded to finish level by the end of the workday.
- 4) Sprinkler systems disrupted by the Contractor shall be capped or restored by the end of the workday. Capped systems shall be restored to original working condition within three (3) days.

- (e) **Miscellaneous Removals and Relocations.** This work shall include all removals not specifically listed in the Proposal or otherwise covered by these Specifications, and all necessary relocations and restorations of walls, fences, plants, hardscape, signs and other items, whether shown on the Plans or not, and as necessary to complete the improvements.

Add the following section:

300-1.3.3 Construction and Demolition Debris Recycling.

General. Consistent with the Agency's efforts to comply with the California Integrated Waste Management Act of 1989 (AB 939), the Contractor shall reduce, reuse, and/or recycle to the maximum extent feasible, the construction and demolition debris (debris) generated by this Contract hereby diverting the debris from disposal facilities, saving landfill space, and conserving virgin materials and natural resources.

Definitions.

"Construction and Demolition Debris or Debris" means materials resulting from building, construction or demolition-related activities such as excavation, grading, land clearing, renovation, repair, road work and site cleanup and are considered solid waste pursuant to Section 40191 of the California Public Resources Code. The materials include, but are not limited to, asphalt, brick, cardboard, carpet, cinder block, concrete, concrete with reinforcement bars, drywall, excavated materials, fixtures and fittings, glass, gravel, green waste, metal, mixed rubble, packaging materials, paper, plastics, porcelain, road work materials, roofing materials, rock, sand, site clearance materials, soil, trees, tree stumps and other vegetative matter, stones and wood waste.

"Deconstruction" means the process of carefully dismantling a structure, piece by piece prior to or instead of conventional demolition, to maximize the recovery of building materials for reuse and/or recycling.

"Delivery Site" means recycling facility as defined in Subsection E.14 and recycling or reuse site as defined in Subsection E.15 or any place, including a transfer station as defined in Subsection E.20 where the debris is delivered for the sole purpose of reuse and/or recycling in a manner acceptable to the Director/Designee.

"Disposal" means the process of disposing of debris at a Disposal Facility.

"Disposal Facility" means a Landfill or any location where the debris is taken for Transformation as defined.

"Generation" means the quantity of debris produced by the Work before the debris is reused and/or recycled.

"Green Waste" means all vegetative cuttings, shrubs, stumps, logs, brush, tree trimmings, grass, and related materials which have been separated from other solid waste.

"Landfill" means a solid waste disposal facility that accepts solid waste for land disposal and is operating under a current Solid Waste Facility Permit issued by a local enforcement agency as defined in Section 40130 of the California Public Resources Code and concurred upon by the California Integrated Waste Management Board.

"Recyclable" means material that still has useful physical or chemical properties after serving its original purpose and that can be reused or re-manufactured into additional products.

"Recycle or Recycling" means the process of collecting, sorting, cleansing, treating, and reconstituting materials that would otherwise become solid waste and returning them to the economic mainstream in the form of raw materials for new, reused, or reconstituted products which meet the quality standards necessary to be used in the marketplace, and in a manner acceptable to the Agency. "Recycle" or "Recycling" does not include Transformation.

"Recycling Facility" means any facility (except a transformation facility) whose principal function is to receive, store, convert, separate, or transfer recyclable materials for processing.

"Recycling or Reuse Site" means any place other than a recycling facility acceptable to the Agency for recycling and/or reuse of debris.

"Reduce" means any action which causes a net reduction in the generation and/or disposal of solid waste.

"Reuse" means the use, in the form as it was produced, and in a manner acceptable to the Agency of materials which might otherwise be discarded into a Disposal Facility.

"Site Clearance Material" means materials such as trees, brush, earth, mixed concrete, rubble, sand, steel, extraneous paper, plastics, and other waste materials generated from site clearance.

"Source Separation" means the segregation, by the generator, of materials designated for separate collection for materials recovery or special handling.

"Transfer Station" means a facility utilized to receive solid wastes and to temporarily store, separate, convert, or otherwise process the materials in the solid wastes, and/or to transfer the solid wastes directly from smaller to larger vehicles or railroad trains for transport.

"Transformation" means incineration, pyrolysis, distillation, gasification, or biological conversion other than composting.

"Wood Waste" means solid waste consisting of wood pieces or particles which are generated from the manufacturing or production of wood products, harvesting, processing or storage of raw wood materials, or construction or demolition activities.

RECYCLING SUMMARY

The Contractor shall prepare and submit a Recycling Summary report using the form included as Appendix IV summarizing the disposal, reuse, and/or recycling activities which occurred throughout the Contract duration. This report shall be submitted by the Contractor to the Agency, before or with its request for the final Progress Payment for said Contract.

Failure of the Contractor to submit the Recycling Summary within the time specified will result in damages being sustained by the Agency. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For failure to submit the Recycling Summary, as required, the Contractor shall pay to the Agency, or have withheld from monies due it, the sum of \$10,000 for a contract of \$500,000 or more. The Contractor shall pay to the Agency, or have withheld from monies due it, 2% of the total contract amount for a contract of \$499,999 or less.

Execution of the Contract shall constitute agreement by the Agency and Contractor that \$10,000 (2% for contracts \$499,999 or less) is the minimum value of the costs and actual damage caused by the failure of the Contractor to submit the Recycling Summary within the time specified. Such sum is liquidated damages and shall not be construed as a penalty, and may be deducted from payments due the Contractor.

PAYMENT

The cost of construction and demolition debris recycling and completing the Recycling Summary report shall be considered as included in the Contract Unit Price for the various Bid items. The quantities reported will be used for information gathering purposes and not for purposes of payment to the Contractor.

300-1.4 Payment Replace the entire subsection with the following:

When the Contract does not include a pay item for clearing and grubbing, payment under this section shall be by the following:

- a) **Trees.** Payment for tree removals and disposal shall be per the Contract Unit Price and shall include all work involved in tagging, cutting and complete removal of trunks, branches, stumps and roots; hauling, disposal, restoration and replanting of removal areas; and other appurtenant work.

300-2 UNCLASSIFIED EXCAVATION

300-2.2 Unsuitable Material.

300-2.2.1 General. Replace the first paragraph with the following:

If unsuitable material is found, the Contractor shall remove said material to the limits to be determined by the Engineer and shall replace said material with select fill or base material, as to be determined by the Engineer. Payment for removal and replacement shall be made as Extra Work or Force Account Work.

Alternatively, as determined and directed by the Engineer, the Contractor shall install geotextile fabric (Per Section 213 ENGINEERING FABRICS of these Special Provisions) on the subgrade to the limits determined by the Engineer in lieu of unsuitable material

excavation and CAB backfill.

SECTION 306 – UNDERGROUND CONDUIT CONSTRUCTION

306-1 OPEN TRENCH OPERATIONS

306-1.1 Trench Excavation

306-1.1.1. General. Add the following:

The bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe and shall be given a final trim using a string line for establishing grade, such that each pipe section when first laid will be continually in contact with the ground along the extreme bottom of the pipe.

Payment for this work shall be included in the Contract Unit Price for the installation of the main pipeline.

306-1.1.2 Maximum Length of Open Trench. Replace the first paragraph with the following:

The Contractor shall either place backfill or steel plate or place temporary fencing at the end of each work day to protect the open trenches. The last twenty (20) feet of each trench may be open provided that this length is covered with traffic rated plating or fencing.

306-1.1.3 Maximum and Minimum Width of Trench. Add the following:

For sewers, potable and reclaimed water pipelines and storm drains, the bottom of the trench shall have a minimum width equal to the outside diameter of the pipe plus 12 inches and a maximum width equal to the outside diameter of the pipe plus 16 inches, unless otherwise shown on the Plans.

Add the following subsections:

306-1.1.7 Trench Over-Excavation. Trenches shall be over-excavated beyond the depth shown when ordered by the Engineer. Such over-excavation shall be to the depth ordered. The trench shall be refilled to the grade of the bottom of the pipe with either selected granular material obtained from the excavation, sand or crushed rock, at the option of the Engineer. When crushed rock is ordered, the material shall be a well-graded material of 1-1/2 inch maximum size. Bedding material shall be placed in layers brought to optimum moisture content, and compacted to 95 percent of maximum density where the pipeline trench passes under structures and 90 percent elsewhere. All work specified in this subsection shall be performed by the Contractor and paid in accordance with 3-3 of these Special Provisions.

Any over-excavation carried below the specified grade and not ordered by the Engineer, specified or shown on the Plans, shall be refilled to the required grade with suitable selected granular material. Such material shall be moistened as required and

compacted to 95 percent of maximum density under structures and 90 percent elsewhere. Such work shall be performed by the Contractor at its own expense.

306-1.2 INSTALLATION OF PIPE

306-1.2.1 Bedding.

(A) General. Replace the second sentence of the third paragraph with the following:

There shall be 4 inches minimum of bedding below the pipe barrel of sewer and storm drain pipes and 6 inches minimum of bedding below the pipe barrel of water pipes.

Add the following to the fifth paragraph:

Bedding material for ductile iron water lines shall be sand conforming to the requirements of 200-1.5.3 (minimum SE of 70) and 200-1.5.5 and shall be compacted to 95 percent of maximum density where the trench is located under structures, and 90 percent of maximum density elsewhere.

Bedding material for PVC pipelines shall have a minimum SE of 30. Bedding shall be imported sand with 100 percent passing a 3/8-inch sieve and not more than 20 percent passing a 200-mesh sieve.

Bedding for sewer pipes shall conform to City of Torrance Standard Plan T204-2. Bedding for storm drain pipes shall conform to City of Torrance Standard Plan No. T302-1.

306-1.2.2 Pipe Laying. Add the following:

Unless otherwise shown on the Plans or directed by the Engineer, minimum pipe cover for water pipes shall be 42 inches below proposed grade. Installation of ductile iron water mains and appurtenances shall conform to the requirements of AWWA C600. Installation of PVC pipes shall conform to the requirements of AWWA C900 and C905. The Contractor shall install pipe closure sections, fittings, valves and appurtenances shown, including pipe supports, bolts, nuts, gaskets and joining materials necessary for a complete installation.

At all times when the work of installing water mains, reclaimed water pipelines, sewers or storm drains is not in progress, all openings into the pipe and the ends of the pipe in the trenches or structure shall be kept tightly closed to prevent entrance of animals and foreign materials. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, shall assume full responsibility for any damage due to this cause and shall, at no cost to the CITY, restore and replace the pipe to its specified condition and grade if it is displaced due to floating. The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the Engineer.

Unless otherwise shown on the Plans or directed by the Engineer, concrete thrust blocks shall be constructed at all changes in direction. Thrust blocks shall be constructed against undisturbed earth. Each thrust block shall be placed so that valves and fittings are

accessible for repair. Thrust blocks shall be as shown on City of Torrance Standard Plan No. T713, or as directed by the Engineer.

All exposed piping shall be adequately supported with devices of appropriate design. Where details are shown on the Plans, the supports shall conform thereto and shall be placed as indicated; provided that the support for all piping shall be complete and adequate regardless of whether or not supporting devices are specifically called for on the Plans.

306-1.2.13 Installation of Plastic Pipe and Fittings. Add, "of these Special Provisions," to the end of the first sentence of the first paragraph.

Replace the first sentence of the third paragraph with the following:

The bedding zone shall extend down to not less than 4 inches below the pipe or bell, whichever is lower in elevation.

Add the following:

PVC pipe construction shall conform to AWWA Manual No. M23, "PVC Pipe - Design and Installation," and the manufacturer's installation guide. Combined deflections at PVC pipe joints with factory-assembled bell couplings shall not exceed 2 degrees or 75 percent of that recommended by the manufacturer, if smaller. All fittings and valves shall be supported so that the pipe is not subjected to the weight of those appurtenances.

Add the following subsections:

306-1.2.14 Flexible Couplings. Flexible couplings shall be installed according to the following requirements:

- 1) Clean each pipe end for a distance of 6 to 8 inches. Remove oil, dirt, loose scale, and rust so that the gaskets will seat on the pipe barrel to provide a positive seal. Wire brushes or non-oily rags may be used, depending on the condition of pipe ends.
- 2) Slip the follower rings over the pipe ends and slide them back over the cleaned area.
- 3) Wipe the gaskets clean, immerse them in soapy water or approved gasket lubricant, and slide them over the pipe ends.
- 4) Clean the coupling middle ring, paying particular attention to flare on the ends where the gasket will seat. Slip the middle ring entirely over the end of the pipe.
- 5) Position the end of the pipe to be joined to the other pipe such that a 1/2-inch gap is maintained between pipes. Center the coupling middle ring over the gap.
- 6) Lubricate the pipe and the flares of the middle ring with soapy water or gasket lubricant. Slide the gaskets and followers into place making sure the gaskets are pushed under the middle ring flare all the way around.

- 7) Insert the bolts. Nuts should be run on with the rounded or chamfered edge toward the follower ring.
- 8) Wrenching should be done progressively, drawing up the bolts on opposite sides a little at a time and returning to retighten until all bolts have a uniform tightness. During wrenching it is advisable to strike the follower rings with a hammer occasionally to make sure they are seating properly.
- 9) Torque application shall be in accordance with the manufacturer's recommendations.

306-1.3. Backfill and Densification.

306-1.3.1 General. Delete the seventh through the eleventh paragraphs and replace with the following:

Where trench is less than or equal to two (2) feet wide in the roadway, the trench shall be backfilled with a sand-cement slurry (100-E-100) backfill per City of Torrance Standard Plan No. T116-M Notes 1A and 2A, unless otherwise approved by the Engineer.

Where trench is greater than two (2) feet wide or if trench walls are sloped, the trench shall be backfilled with Crushed Miscellaneous Base or other material with a sand equivalent of 30 or greater and shall be select granular material free from organic matter per City of Torrance Standard Plan No. T116-M, Notes 1A and 2A. Imported backfill material shall be in accordance with 306-1.3.7. Backfill material shall be moistened to optimum moisture content and compacted to 95 percent of maximum density in the upper 3 feet and 90 percent below the upper 3 feet.

306-1.3.4 *(omitted from this specification)*

306-1.3.5 Jetted Bedding and Backfill Compaction Requirements. Replace the entire subsection with the following:

Trench bedding and backfill densified through jetting shall be densified to a minimum relative compaction of 95 percent in the upper 3 feet of backfill and 90 percent below the upper 3 feet.

306-1.3.6 Mechanical Compaction Requirements. Replace the entire subsection with the following:

Mechanically compacted trench backfill shall be densified to a minimum relative compaction of 95 percent in the upper 3 feet of backfill and 90 percent below the upper 3 feet.

Add the following subsection:

306-1.3.9 Compaction Tests. Tests to determine materials compaction shall be performed by a separate CITY-hired subcontractor, at the CITY's expense, except that all tests which fail to meet the requirements of these Special Provisions shall be paid for by the Contractor. Maximum density shall be determined in accordance with ASTM D1557 method, modified to use five layers. Field density tests shall be performed in accordance with the test procedure specified in ASTM D1556.

306-1.4 Testing Pipelines.

306-1.6 Basis of Payment for Open Trench Installations. Add the following as first sentence of the first paragraph:

This subsection shall apply to payment of installed storm drain pipes.

Revise the second paragraph to read:

The price per linear foot for pipe and conduit in place shall be considered full compensation for all wyes, tees, bends, thrust blocks, fittings, and specials shown on the Plans; the removal of interfering portions of existing improvements; the excavations of the trench; the control of ground and surface waters; the preparation of subgrade; placing and joining pipe; connecting to existing systems; beddings; backfilling the trench; and all other work necessary to install the pipe or conduit, complete in place.

Delete the phrase, "excluding temporary resurfacing" from the last two paragraphs.

Add the following to the last paragraph:

The Contract Unit Price for each grating catch basin shall include full compensation for all work involved in constructing the grating catch basin and connector pipe, and shall include the costs of survey, excavation, bedding, placing and compacting backfill, fine grading as needed, subgrade preparation, local depression, hauling and dumping.

Add the following paragraph:

The Contract Unit Price for trench shoring shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, necessary to complete the Work.

Add the following subsections:

SECTION 308 – LANDSCAPE AND IRRIGATION INSTALLATION

308-2 EARTHWORK AND TOPSOIL PLACEMENT.

308-2.1 General. Add the following:

The landscape work shall not begin until all other trades have repaired all areas of settlement, erosion, rutting, etc., and the soils have been re-established, recompact and refinished to final grades. The Engineer shall be notified of all areas where the landscape work is prevented from being executed.

Surface drainage shall be provided by modeling the surfaces to facilitate the natural run-off of water. Low spots and pockets shall be filled with topsoil and graded to drain properly.

308-2.3 Topsoil Preparation and Conditioning

308-2.3.1 General. Substitute Class A with Class C in the first sentence of the first paragraph.

Add the following:

Before soil preparation operations are started in any area, the Contractor shall remove and dispose of all trash and any other debris on the surface of the ground.

Mowing and spraying operations shall be performed in all areas throughout the limits of the landscape portion of the Work. The sequence of operations shall be determined by the Engineer. Before applying any chemical spray material, the Contractor shall obtain from the Engineer written approval of the material to be used, the rate, and method of application.

Stolon-type grasses and weeds shall be killed by spraying with an approved weed control chemical. Other weeds shall be mowed as close to the ground as possible. Such weeds or grasses shall be removed by grubbing prior to cultivating.

Any weed growth which subsequently appears shall be killed by additional spraying before the weeds exceed two (2) inches in height. At the time of planting, each area to be planted shall be free of living weeds of any height.

The Contractor immediately shall remove and dispose of mowed weed growth and all other debris generated by clearing and grubbing when so directed by the Engineer.

308-4 PLANTING

308-4.1. General. Add the following:

Inspection and approval of specimens shall be required before delivery to site; all others on delivery. Any plants rendered unsuitable for planting because of this inspection

shall be considered as samples and shall not be paid for. In case the sample plants inspected are found to be defective, the Engineer reserves the right to reject the entire lot or lots of plants represented by the defective samples. Rejected plants shall be removed from the site immediately. Random samples will be inspected for root condition.

All plants shall be true to name, and one of each bundle or lot shall be tagged with the name and size of plants, in accordance with the standards of practice recommended by the American Association of Nurserymen. The root condition of plants furnished in containers shall be determined by removal of earth from the roots of not less than two (2) plants, nor more than 2 percent (2%) of the total number of plants of each species or variety, except when container-grown plants are from several different sources; in which case, the roots of not less than two (2) plants of each species or variety from each source shall be inspected by the Engineer at his option. The selection of plants to be inspected will be made by the Engineer.

All plants of the same species and container size (i.e., the same specification) shall be uniform in size and shape and at the same stage of growth to the satisfaction of the Engineer.

All plants shall be fully acclimated and in an active growing state.

The Contractor shall remove all lateral growth that is not acceptable and/or shape all plants to the satisfaction of the Engineer.

All plants shall be full-sized and shall have root systems at a fully developed state within the container.

Hair roots should extend to the edge of the container. No plant shall be root-bound. Root balls may require scarification to the satisfaction of the Engineer.

No boxed, balled or canned plants shall be planted if the ball is broken or cracked, whether before or during the process of planting. Any plant transplanted by the Contractor that dies or has bark, branch or die-back injury shall be replaced at the Contractor's expense with an equal plant to the satisfaction of the Engineer.

Before plants are transported to the planting area, they shall be properly pruned or cut back to reduce damage by wind and to force lateral growth.

No plants shall be transported to the planting area that are not thoroughly wet throughout the ball of earth surrounding the roots. Plants should not be allowed to dry out, nor shall any roots be exposed to the air except during the act of placement. Any plant that, in the opinion of the Engineer, is dry or in a wilted condition when delivered or thereafter, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.

All inspections herein specified shall be made by the Engineer. The Contractor shall request inspection at least 48 hours in advance of the time inspection is required. Inspection shall be required on the following stages of the work:

- a) During preliminary grading, soil preparation, and initial weeding.

- b) When plants are spotted for planting, but before planting holes have been excavated.
- c) When finish grading has been completed.
- d) When all specified work, except the maintenance period has been completed.
- e) Final inspection at the completion of the maintenance period.

The Contractor's failure to obtain inspection will extend the start and/or finish of the maintenance period as applicable, unless otherwise agreed to in writing by the Engineer.

308-4.8 Lawn Planting

308-4.8.2 Seed. Add the following to Method B.

Prior to the application of hydro-mulch, the fine grading of all lawn areas shall be inspected and approved by the Engineer. Seedbeds shall be treated with 5% Dieldrin in granular form at the rate of 3 1/2 pounds per 1000 square feet and lightly watered. After 24 hours (minimum) have elapsed, the seedbeds shall be prewetted prior to hydroseeding and shall be kept continually moist after hydroseeding.

All equipment used to apply hydromulch shall be subject to the approval of the Engineer. The equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing not less than 40 lbs. of fiber mulch plus a combined total of 7 lbs. fertilizer solids for each 100 gallons of water.

Hydraulic spray nozzles shall provide a continuous non-fluctuating discharge. The slurry tank shall have a minimum capacity of 1,500 gallons and shall be mounted on a traveling unit, either self-propelled or drawn by a separate unit, which will place the slurry tank and spray nozzle within sufficient proximity to the areas to be seeded.

The slurry preparation shall take place at the site of Work and shall begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good re-circulation shall be established and at this time the seed shall be added. Fertilizer shall then be added to the mixture after the seed and when the tank is at least one-third filled with water.

The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp mulch shall be added by the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full.

Spray the area with a uniform visible coat using the dark color of the cellulose fiber or organic amendment as a visual guide. The slurry shall be applied in a downward drilling motion via a fan stream nozzle. It is important to ensure that all of the components enter and mix with the soil.

All slurry mixture which has not been applied within four (4) hours after mixing shall be rejected and removed from the Work at the Contractor's expense.

Special care shall be exercised by the Contractor to prevent any of the slurry from being spilled or sprayed anywhere except onto areas to be hydroseeded. Any spillage or overspray immediately shall be removed by and at the expense of the Contractor to the satisfaction of the Engineer.

Seed shall be applied at a minimum rate of five (5) pounds per 1000 square feet.

If complete and full germination is not obtained within 14 days, the Contractor shall hand seed with the same seed mixture and top dress with nitrohumous and redwood soil amendment all areas designated by the Engineer.

Add the following subsections:

308-6 MAINTENANCE AND PLANT ESTABLISHMENT. Replace the entire subsection with the following:

The Establishment and Maintenance Period shall begin on the first day after all planting in this Work is completed and accepted, and shall continue thereafter until 90 calendar days have passed. Notify the Engineer at least seven (7) days in advance of completion. Failure by the Contractor to notify the Engineer will delay the start of the Establishment and Maintenance Period.

Should the Establishment and Maintenance Period be extended beyond the prescribed 90 calendar days because of rejection by the Engineer for whatever reason, the entire installation shall remain the responsibility of the Contractor unless otherwise determined by the Engineer. Any rejected material shall be replaced and the 60 calendar day Establishment and Maintenance Period shall be restarted from that time for the replaced material only.

All areas landscaped or restored under this Contract shall be maintained by the Contractor. The Contractor, without any expense to the CITY, shall weed the planted areas as needed and shall remove all accumulated debris from the landscaped areas as needed and/or as called for by the Engineer.

308-6.1. Payment. Payment for 90 Day Plant Establishment shall be on a lump sum basis per the Contract Unit Price. The Contract Unit Price shall include full compensation for all tools, materials, labor, equipment, water and incidentals to complete this work in accordance with the Plans and Special Provisions.

308-7 GUARANTEE Add the following:

All other plant material shall be guaranteed to live and grow for a period of ninety (90) calendar days from the date of final acceptance of the contract work unless decline of the plant material is specifically attributable to causes unrelated to installation, plant material quality, and the Contractor's maintenance practices.

Any plant material found to be dead, missing, or in poor condition during the post-construction maintenance period, shall be replaced immediately at the Contractor's

expense. The Engineer shall be the sole judge as to the condition of the material. Replacement shall be made to the same specifications required for the original plantings.

During the guarantee period, should the Contractor fail to expeditiously replace dead plant material upon written notification by the Engineer, the City shall cause the work to be corrected and bill the actual costs incurred to the Contractor.

308-8. PAYMENT Replace the entire subsection with the following:

308-8.1 The Contract Unit Price for "Subsurface Flow (SSF) Treatment Wetland, including pre-treatment chamber and flow control chamber shall include full compensation to perform all grading, relocate access road, install the landscaping (as detailed in this Section, including prepared topsoil, furnishing and planting trees, shrubs, and plants) and all incidentals to complete in place, as shown on the Plan and per these Specifications, excluding 90 Day Plant Establishment.

308-8.2 Payment of hydroseeding including prepared topsoil, furnishing mulch, grass seed and incidentals complete in place, as shown on the Plan and per these Specifications, shall be included in other items of work and no additional payment shall be made.

SECTION 310 - PAINTING

310-5.9 Waterproofing (Concrete)

310-5.9.1 General. The Contractor shall furnish all material, labor and equipment necessary to waterproof the exterior of all concrete lined treatment cells.

310-5.9.2 Surface Preparation

- 1) Do not treat concrete surfaces with chemical hardeners or curing agents prior to the application of waterproofing.
- 2) Examine surfaces to be waterproofed for form tie holes and structural defects, such as honeycombing, rock pockets, faulty construction joints, cracks, etc. Repair these areas in accordance with Section 303.
- 3) Concrete surfaces shall have an open capillary system to provide tooth and suction and shall be clean, free from scale, form oil, latency, curing compounds, and any other foreign matter. Lightly sandblast, water blast, or acid etch with muriatic acid (15% to 20%) to provide a clean absorbent surface. Saturate surfaces to be acid etched with water prior to application of acid. Vertical surfaces may have a sacked finish. Do not apply a slurry coat of water materials to horizontal concrete deck surfaces that are less than 20 hours old.
- 4) Use light sandblasting or etching to remove the surface glaze of dense or steel troweled concrete.

- 5) Abrasive clean and wash construction joints.

310-5.9.3 Application

- 1) After completing repairs, apply a top-coat system to the concrete surfaces to be treated, apply after curing and finishes are complete. Application of waterproofing and any point top coatings shall conform to the manufacturers recommended application procedures.
- 2) The Contractor shall have the manufacturer's representative advise and/or supervise the waterproofing application in person.
- 3) Apply crystalline waterproofing material to concrete, which has been thoroughly saturated with clean water. Moisten surfaces to be treated prior to application. Remove free water prior to application of waterproofing material.
- 4) Apply crystalline waterproofing to:
 - (a) Interior walls and roof of concrete vaults and manholes. Exterior walls of concrete vaults and manholes.
 - (b) Joints of precast concrete manholes as shown on the Plans.
 - (c) The interior surfaces shall have a white color and the exterior a gray color.
- 5) Apply second coat when the first coat has reached an initial set. Use light water spray on surfaces to be coated if rapid drying occurs.

310-5.9.4 Payment. There shall be no separate payment for waterproofing. This cost shall be included in the work to which it is appurtenant.

APPENDIX I
CITY OF TORRANCE PERMIT AND BUSINESS LICENSE



City of Torrance, Community Development Department

Permit Application Form

3031 TORRANCE BLVD. • TORRANCE, CA 90503

OWNER/APPLICANT INFORMATION

Name: _____
Address: _____
City/State: _____
Zip: _____
Phone: _____

Evacuation permits will not be issued without
USA I.D. number.

Underground Service Alert
Call 1-800/227-2600

USA I.D. #: _____

CONTRACTOR INFORMATION ON FILE

State License #: _____
Class: _____ Exp. Date: _____
City Business #: _____
Workers Comp. #: _____
Exp. Date: _____

JOB LOCATION/ADDRESS

(or closest street address)

Please list cross streets: _____

DESCRIPTION OF WORK

Lin/Ft Trench _____ Width of Trench _____ Lin/Ft Curb & Gutter _____
Lin/Ft Bore _____ Sewer Connection _____ Number of Curb Drains _____
Sq/Ft Asphalt _____ Sq/Ft Concrete _____ Sq/Ft Dirt _____

Work Order Number (for utility companies): _____

Applicant or Authorized Signature: _____

For further permit information, please call 310/618-5898 or Fax 310/618-2846.

Contractor Qualification List

| | | | |
|---------------------|---|----------------------|---|
| Curb/Gutter | A(General Engineering) C8(Concrete Contractor) | Sewer Mainline | A(General Engineering) C34(Pipeline Contractor) C42(Sanitation Contractor) |
| Driveways | A(General Engineering) C8(Concrete Contractor) | Storm Drains | A(General Engineering) C34(Pipeline Contractor) C42(Sanitation Contractor) |
| Sidewalks | A(General Engineering) B(General Building) C8(Concrete Contractor) | U/G Utilities | A (General Engineering) (Water, Gas or Oil) C34 (Pipeline Contractor) |
| Street/Alley | A(General Engineering) C8(Concrete Contractor) C12(Earth and Paving Contractor) | U/G Electrical | A (General Engineering) C8 (Concrete Contractor) C12 (Earth and Paving Contractors) |
| Sewer Lateral | A (General Engineering) C34(Pipeline Contractor) C42(Sanitation Contractor) | | |

Contractor Qualification List

- 1) FOR INSPECTIONS 24 hour notice is required, before, during, and after construction. Call 310-618-5898, 7:30 AM – 5:30 PM, to SCHEDULE AN INSEPTION.
- 2) Provide TRAFFIC CONTROL per the "CITY OF TORRANCE CONSTRUCTION TRAFFIC CONTROL PROCEDURES." Street closures shall be per City of Torrance Standard T603. Major street lane closures between 8:30 AM – 3:30 PM only. ONE STANDARD ARROWBOARD REQUIRED FOR EACH LANE CLOSURE.
- 3) Permit is not valid until two working days after notifying DIG-ALERT of project. USA # _____.
- 4) Do not remove any trees or shrubs without approval of Torrance Tree Supervisor (310-781-6900).
- 5) Contractor will be billed for overtime inspection services. OVERTIME REQUESTS must be submitted for approval 24 hrs in advance.
- 6) Construction site CLEANUP and GRAFFITI removal must be completed prior to finaling of this permit. The work site shall be kept in a well maintained condition. Signage shall be free of graffiti, replaced if bent, vandalized or displays loss of reflectivity. Any graffiti on construction signs must be removed or replaced within 24 hours of notification.
- 7) Any street striping, crosswalk, raised reflective pavement marker or pavement markings damaged by this construction shall be replaced to the satisfaction of the Torrance Public Works Department (310-781-6900).
- 8) THIS PERMIT WILL BE REVOKED if any pollutant is released into or allowed to remain in any component of the city drainage system.
- 9) Trench backfill and pavement repairs shall be per City of Torrance Standard T116.
- 10) Any irrigation system components damaged by this construction shall be replaced to the satisfaction of Park Services (310-618-2930).
- 11) All survey monuments in the project area MUST be located and tied out and a Corner Record filed prior to the start of construction. Also, all destroyed monuments must be replaced prior to receiving final inspection.
- 12) It is the responsibility of the contractor to REPLACE any PAVEMENT removed by this construction.
- 13) The City of Torrance is held harmless from the results of any action or accidents caused by the permittee, his employees, or equipment in the performance of the work described or covered in this permit. Validation of this permit SHALL NOT be held to permit or to be an approval of the violation of any applicable provision of the City Code covering this work, or any other provisions of the City of Torrance Code. In the granting of a Construction & Excavation permit, the Community Development Director may impose such conditions thereon, in addition to those otherwise provided herein, as are reasonably necessary to prevent the proposed operations from being conducted in such a manner as to constitute or create a HAZARD TO LIFE or property or be detrimental to property.

**NOTICE
CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT/
ENGINEERING DIVISION
NEW INSURANCE REGULATIONS**

The City of Torrance Community Development Department/Engineering Division will be requiring proof of liability insurance from each contractor applying for a Construction & Excavation permit to work in the public right-of-way or in a public easement beginning October 1, 2001. Insurance shall cover contractor and vehicles used in the construction. The attached requirements dated September 20, 2001 will detail the insurance limits.

All insurance certificates shall have an additional clause that states: *"The City of Torrance, the City Council and each member thereof, members of boards and commissions, every officer, agent, official, employee and volunteer"* as additional insured.

Contractors should bring in proof of insurance at the time of application for permit. For major companies that are self-insured, a letter stating this fact and signed by an officer of the firm will be acceptable. Annual insurance may also be kept on file for contractors working periodically within the City of Torrance.

If you have any questions, please contact the Engineering Division Permit Counter at 310-618-5898.

JEFFERY W. GIBSON
Community Development Director
City of Torrance

EFFECTIVE 8/11/03

8/11/03

CITY OF TORRANCE
COMMUNITY DEVELOPMENT DEPARTMENT/
ENGINEERING DIVISION

PERMIT APPLICATION FORM
INSURANCE REQUIREMENTS

Any entity performing work on City streets, right-of-way, and property must comply with the following requirements.

1. TYPE OF INSURANCE

Any entity performing work must maintain at their sole expense the following insurance, which shall be full coverage not subject to self-insurance provisions.

- General Liability including coverage for premises, products and completed operations, underground hazards, independent contractors, personal injury and contractual obligations with combined single limits of at least \$1,000,000 per occurrence.
- Automobile Liability, including owned, non-owned and hired vehicles, with at least the following limits of liability:
 - Primary Bodily Injury with limits of at least \$500,000 per person, \$1,000,000 per occurrence AND; Primary Property Damage with limits of at least \$500,000 per occurrence, OR
 - Combined single limits of at least \$1,000,000 per occurrence.
- Workers' Compensation with limits as required by the State of California and Employer's Liability with limits of at least \$1,000,000.

2. CERTIFICATES

- Certificates or an attached endorsement must be provided that contains the following provisions:
 - The City of Torrance, the City Council and each member thereof, members of boards and commissions, every officer, agent, official, employee and volunteer must be named as additional insured under the automobile and general liability policies.
 - The insurance policies required by this clause shall contain a provision that no termination, cancellation or change of coverage can be made without 30 days written notice to the City.

3. FILING REQUIREMENTS

- Certificates of insurance and/or endorsements must be provided to the Community Development Department, Permits and Records Section, 3031 Torrance Blvd., Torrance, CA 90503, prior to the issuance of the permit.

4. ADDITIONAL REQUIREMENT

- Insurance required of any entity performing work will be satisfactory only if issued by companies rated "B+" or better in the most recent edition of Best's Key Rating Guide, and only if they are of a financial category of a VII or better, unless these requirements are modified or waived by the City's Risk Manager.

Please call the Business License Office at 310-618-5923 for fee amounts. Payment must be submitted with your application.

FOR OFFICIAL USE ONLY


1. LICENSE NO. _____

2. CATEGORY NO. _____

3. CATEGORY NO. _____

4. HEALTH PERMIT _____

5. S.I.C. CODE _____



City of Torrance, Revenue Division
Business License Application
 3031 Torrance Boulevard, Torrance, California 90503 • 310/618-5828

PART I. APPLICANT TO ANSWER ALL QUESTIONS IN THIS SECTION (print or type)

6. BUSINESS NAME OR DBA _____

7. BUSINESS ADDRESS _____ CITY _____ STATE _____ ZIP _____

8. MAILING ADDRESS _____ CITY _____ STATE _____ ZIP _____

9. TYPE OF BUSINESS (check type of business being conducted at this location) _____

10. NAME OF PERSON MAKING APPLICATION (print name of owner, partner or corporate officer) _____

11. TITLE _____

12. BUSINESS PHONE _____

13. HOME PHONE _____

14. STATE SALES TAX NO. _____

15. SOCIAL SECURITY NO. _____

16. PERM. NO. _____

17. SQUARE FOOTAGE _____

18. PARTNERSHIP INFORMATION

19. PARTNERSHIP ☐ PARTNERSHIP ☐ CORPORATION ☐ SOLE OWNERSHIP ☐

20. NAME OF OWNER, PARTNER, OR PRINCIPAL OFFICER _____

21. TITLE _____

22. HOME ADDRESS _____

23. HOME PHONE _____

I declare that I am the owner, partner, corporate officer or person with the power of attorney, and I understand that the information provided above is not the true business license being applied for may be reviewed as outlined in section 31.6.10 of the Torrance Municipal Code.

I am duly authorized to make this application and all of the information provided in this application is true and correct. The business will not provide any services, good or product which is illegal under Federal, State, or Local Laws. I declare under penalty of perjury that the foregoing is true and correct.

SIGNATURE _____ DATE _____

PART II. FOR OFFICIAL USE ONLY

24. BASIC FEE _____ APPLICATION IDENTIFICATION _____ PROCESSING FEE _____ TYPE BUS. FEE _____ OTHER _____

25. PERMIT FEE _____ YES ☐ NO ☐ OTHER (explain) _____

26. PENALTY FEE _____ HOLDS ☐ YES ☐ NO ☐ DATE _____ ENTER FEE _____

27. RECEIVED BY _____ CHECK NO. _____ BANKING _____ CASH _____ TOTAL AMOUNT \$ _____

APPENDIX II
CITY OF TORRANCE STANDARD PLANS

APPENDIX III
SPPWC STANDARD PLANS

APPENDIX IV
CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING SUMMARY

CONSTRUCTION AND DEMOLITION DEBRIS RECYCLING SUMMARY

Project Type: ☐ Roadway and/or Bridge/Structure ☐ Water/Sewer
☐ Traffic Signal/Street Lighting ☐ Other _____

Project Name: _____ Date: _____

City Contract No. _____

Project Location: _____

Thomas Guide Page/Grid No(s): _____

Contractor Name: _____

Contractor Address: _____

Contractor License #: _____

Project Duration: From: _____ To: _____

Demolition and Recycling Cost: \$ _____

| Type(s) of Debris Generated | Total Quantity Generated (tons, c.y. or units) | Reuse /Recycling | | Disposal | |
|-----------------------------|--|--------------------------------------|---------------------------------------|--------------------------------------|---------------------------|
| | | Total Quantity (tons, c.y. or units) | Name of Reuse/Recycling Facility/Site | Total Quantity (tons, c.y. or units) | Name of Disposal Facility |
| Asphalt | | | | | |
| Brick | | | | | |
| Concrete | | | | | |
| Green Waste | | | | | |
| Metal (ferrous) | | | | | |
| Metal (non-ferrous) | | | | | |
| Mixed Debris | | | | | |
| Rock | | | | | |
| Soil | | | | | |
| Wood Waste | | | | | |
| Other: | | | | | |
| Total | | | | | |

Notes:

- N. Other debris types may include, but are not limited to, Ash, Cardboard, Carpeting, Glass, Gravel, Land Clearing Debris, Non-friable Asbestos, Paper, Plastic, Porcelain, Roofing Material, Sand, and Tires. Attach additional sheets if necessary.
- O. If the debris is taken to a transfer station solely for the purpose of reuse/recycling, then list the transfer station as the reuse/recycling facility/site.
- P. If the debris is taken to a transfer station solely for the purpose of transfer to a disposal facility, then list the transfer station as the disposal facility.

Prepared by _____ Signature _____ Phone #: _____

APPENDIX V
MANUFACTURER'S DRAWINGS

APPENDIX VI

**CONSTRUCTION ACTIVITIES
STORM WATER GENERAL PERMIT
ORDER NO. 99-08-DWQ**

**NOTICE OF INTENT
AND
NOTICE OF TERMINATION
FOR ORDER NO. 99-08-DWQ**

Additional information about these requirements and documents can be obtained at

http://www.waterboards.ca.gov/water_issues/programs/stormwater/gen_const.shtml#const_permit

**Go to the website and download these documents
and include in your specifications**